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ABSTRACT

Intended for classroom use only, these unpublished notes contain computer lessons on descriptive statistics with files previously created in WordPerfect 4.2 and Lotus 1-2-3 Version 1.A for the IBM PC+. The statistical measures covered include Student's t-test with two independent samples; Student's t-test with a paired sample; Chi-square analysis; Pearson's product moment coefficient of correlation; One-way analysis of variance, with Tukey mean comparison; Two-way analysis of variance; Using PLOT and HISTOGRAM to display data; Simple linear regression; and Using SELECT IF, COMPUTE, and IF to calculate descriptive statistics. (ALF)

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# Nova University

Center for Computer and Information Sciences

ED352025

## EXAMPLES OF DATA ANALYSIS

## WITH SPSS/PC+ STUDENTWARE

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THOMAS W. MACFARLAND, Ed.D.

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# EXAMPLES OF DATA ANALYSIS WITH SPSS/PC+ STUDENTWARE

Thomas W. MacFarland, Ed.D.

Unpublished notes of the author
December, 1989

```
* Test:      Descriptive Statistics, with files previously
*            created in WordPerfect 4.2 and Lotus 1-2-3
*            Version 1.A
*
* Author:    Thomas W. MacFarland, Ed.D.
*
* Source:    Personal notes
*
* Software:  SPSS/PC+ Studentware
*
* Scenario:  Based on data provided in Table 1, determine the
*            mean for subject Tom.
```

Table 1

Summary Data

| Test # | Tom | Bob | Roy | Sue | Bea |
|---|---|---|---|---|---|
| 1 | 089 | 091 | 081 | 081 | 083 |
| 2 | 091 | 081 | 071 | 089 | 100 |
| 3 | 091 | 065 | 045 | 081 | 092 |
| 4 | 082 | 071 | 062 | 079 | 081 |
| 5 | 072 | 067 | 091 | 085 | 094 |

```
* Answer:    Answer(s) can be found in sample.lis.  Briefly,
*
*            Mean for Tom = 85.00
*
*            Be sure to rename spss.lis to sample.lis.

DATA LIST /
     Test_#        01
     Tom         03-05
     Bob         07-09
     Roy         11-13
     Sue         15-17
     Bea         19-21.

VARIABLE LABELS
     Test_#    "Test Number (of five)"
```

```
      Tom         "Thomas R. O'Callish"
      Bob         "Robert E. Lee, IV"
      Roy         "Leroy G. Anglesh"
      Sue         "Susan V. Douglas"
      Bea         "Beatrice H. Malcolm".

BEGIN DATA.
1 089 091 081 081 083
2 091 081 071 089 100
3 091 065 045 081 092
4 082 071 062 079 081
5 072 067 091 085 094
END DATA.
                              SPSS/PC+ Studentware                    11/27/89
include 'sample.dat'.
*  Test:       Descriptive Statistics, with files previously
*              created in WordPerfect 4.2 and Lotus 1-2-3
*              Version 1.A
*
*  Author:     Thomas W. MacFarland, Ed.D.
*
*  Source:     Personal notes
*
*  Software:   SPSS/PC+ Studentware
*
*  Scenario:   Based on data provided in Table 1, determine the
*              mean for subject Tom.
*
*
*
```

```
*
*              Mean for Tom = 85.00
*
*              Be sure to rename spss.lis to sample.lis.

DATA LIST /
     Test_#        01
     Tom         03-05
     Bob         07-09
     Roy         11-13
     Sue         15-17
     Bea         19-21.

VARIABLE LABELS
     Test_#      "Test Number (of five)"
     Tom         "Thomas R. O'Callish"
     Bob         "Robert E. Lee, IV"
     Roy         "Leroy G. Anglesh"
     Sue         "Susan V. Douglas"
     Bea         "Beatrice H. Malcolm".

BEGIN DATA.
END DATA.
      5 cases are written to the compressed active file.

This procedure was completed at  1:30:09
FREQUENCIES VARIABLES = Tom / STATISTICS = MEAN.

***** Memory allows a total of    7119 Values, accumulated across all Variables.
      There also may be up to     890 Value Labels for each Variable.
```

---



TOM       Thomas R. O'Callish

| Value Label | Value | Frequency | Percent | Valid Percent | Cum Percent |
|---|---|---|---|---|---|
| | 72 | 1 | 20.0 | 20.0 | 20.0 |
| | 82 | 1 | 20.0 | 20.0 | 40.0 |
| | 89 | 1 | 20.0 | 20.0 | 60.0 |
| | 91 | 2 | 40.0 | 40.0 | 100.0 |
| | TOTAL | 5 | 100.0 | 100.0 | |

Mean          85.000

Valid Cases       5       Missing Cases      0

This procedure was completed at  1:31:44

```
Page   3                       SPSS/PC+ Studentware                    11/27/89
finish
[Next command's output on page   1
include 'sample.dat'.
[*  Test:       Descriptive Statistics, with files previously
[*              created in WordPerfect 4.2 and Lotus 1-2-3
[*              Version 1.A
[*
[*  Author:     Thomas W. MacFarland, Ed.D.
[*
[*  Source:     Personal notes
[*
[*  Software:   SPSS/PC+ Studentware
[*
[*  Scenario:   Based on data provided in Table 1, determine the
[*              mean for subject Tom.
[*
[*
[*                                    Table 1
[*
[*                                 Summary Data
[*
[*              ------------------------------------------------------
[*              ------------------------------------------------------
[*              Test #      Tom       Bob       Roy       Sue       Bea
[*              ------------------------------------------------------
[*                1         089       091       081       081       083
[*                2         091       081       071       089       100
[*                3         091       065       045       081       092
[*                4         082       071       062       079       081
[*                5         072       067       091       085       094
[*              ------------------------------------------------------
[*
[*  Answer:     Answer(s) can be found in sample.lis.  Briefly,
[*
[*              Mean for Tom = 85.00
[*
[*              Be sure to rename spss.lis to sample.lis.
[
[DATA LIST /
[       Test_#          01
[       Tom           03-05
[       Bob           07-09
[       Roy           11-13
```

```
[     Sue         15-17
[     Bea         19-21.
[
[VARIABLE LABELS
[     Test_#      "Test Number (of five)"
[     Tom         "Thomas R. O'Callish"
[     Bob         "Robert E. Lee, IV"
[     Roy         "Leroy G. Anglesh"
[     Sue         "Susan V. Douglas"
[     Bea         "Beatrice H. Malcolm".
[
[BEGIN DATA.
[1 089 091 081 081 083
[2 091 081 071 089 100
[3 091 065 045 081 092
[4 082 071 062 079 081
[5 072 067 091 085 094
[END DATA.
FREQUENCIES VARIABLES = Tom / STATISTICS = MEAN.
[Next command's output on page   3
finish
```

* Test: Descriptive Statistics
*
* Author: Thomas W. MacFarland, Ed.D.
*
* Source: McClave, James T., and Frank H. Dietrich, II.
* STATISTICS, 4th edition. San Francisco,
* California: Dellen Publishing Company, 1988.
* ISBN 0-02-379260-4 Page 48
*
* Software: SPSS/PC+ Studentware
*
* Scenario: Based on data provided in Table 1, determine the
* following for each sample:
*
* 1. Median
*
* 2. Mean
*
* 3. Standard Deviation

Table 1

Summary Data

| Sample #1 | Sample #2 | Sample #3 |
|---|---|---|
| 0039 | 0100 | 0100 |
| 0042 | 0004 | 0004 |
| 0040 | 0007 | 0007 |
| 0037 | 0096 | 0030 |
| 0041 | 0080 | 0080 |
| | 0003 | 0030 |
| | 0001 | 0042 |
| | 0010 | 0002 |
| | 0002 | |

* Note: Use the MISSING VALUE command so that all samples
* can be retained in the same file.
*
* Answer: Answer(s) can be found in mean-sd.lis.
*
* Be sure to rename spss.lis to mean-sd.lis.

```
DATA LIST /
     Sample_1 01-04
     Sample_2 06-09
```

```
     Sample_3 11-14.

VARIABLE LABELS
     Sample_1 "Sample #1"
     Sample_2 "Sample #2"
     Sample_3 "Sample #3".

MISSING VALUE Sample_1 (0999) Sample_2 (0999) Sample_3 (0999).

BEGIN DATA.
0039 0100 0100
0042 0004 0004
0040 0007 0007
0037 0096 0030
0041 0080 0080
0999 0003 0030
0999 0001 0042
0999 0010 0002
0999 0002 0999
END DATA.
                              SPSS/PC+ Studentware                    11/26/89
include 'mean-sd.dat'.
*  Test:       Descriptive Statistics
*
*  Author:     Thomas W. MacFarland, Ed.D.
*
*  Source:     McClave, James T., and Frank H. Dietrich, II.
*                   STATISTICS, 4th edition.  San Francisco,
*                   California:  Dellen Publishing Company, 1988.
*                   ISBN 0-02-379260-4  Page 48
*
*  Software:   SPSS/PC+ Studentware
*
*  Scenario:   Based on data provided in Table 1, determine the
*              following for each sample:
*
*              1.  Median
*
*              2.  Mean
*
*              3.  Standard Deviation
*
*
*                                  Table 1
*
*                              Summary Data
*
*             ------------------------------------------------
*             ------------------------------------------------
*
*             Sample #1          Sample #2          Sample #3
*             ------------------------------------------------
```

```
*
*              0039              0100              0100
*              0042              0004              0004
*              0040              0007              0007
*              0037              0096              0030
*              0041              0080              0080
*                                0003              0030
*                                0001              0042
*                                0010              0002
*                                0002
*
*
*  Note:       Use the MISSING VALUE command so that all samples
*              can be retained in the same file.
*
*  Answer:     Answer(s) can be found in mean-sd.lis.
*
*              Be sure to rename spss.lis to mean-sd.lis.

DATA LIST /
     Sample_1 01-04
     Sample_2 06-09
     Sample_3 11-14.

VARIABLE LABELS
     Sample_1 "Sample #1"
     Sample_2 "Sample #2"
     Sample_3 "Sample #3".

MISSING VALUE Sample_1 (0999) Sample_2 (0999) Sample_3 (0999).

BEGIN DATA.
END DATA.
      9 cases are written to the compressed active file.

This procedure was completed at 14:17:57
FREQUENCIES VARIABLES = Sample_1 Sample_2 Sample_3 / STATISTICS ALL.

***** Memory allows a total of   4652 Values, accumulated across all Variables.
      There also may be up to     581 Value Labels for each Variable.
```

---



SAMPLE_1  Sample #1

| Value Label | Value | Frequency | Percent | Valid Percent | Cum Percent |
|---|---|---|---|---|---|
| | 37 | 1 | 11.1 | 20.0 | 20.0 |
| | 39 | 1 | 11.1 | 20.0 | 40.0 |
| | 40 | 1 | 11.1 | 20.0 | 60.0 |

| | | | | | |
|---|---|---|---|---|---|
| | 41 | 1 | 11.1 | 20.0 | 80.0 |
| | 42 | 1 | 11.1 | 20.0 | 100.0 |
| | 999 | 4 | 44.4 | MISSING | |
| | TOTAL | 9 | 100.0 | 100.0 | |

| | | | | | |
|---|---|---|---|---|---|
| Mean | 39.800 | Std Err | .860 | Median | 40.000 |
| Mode | 37.000 | Std Dev | 1.924 | Variance | 3.700 |
| Kurtosis | -.022 | S E Kurt | 2.000 | Skewness | -.590 |
| S E Skew | .913 | Range | 5.000 | Minimum | 37.000 |
| Maximum | 42.000 | Sum | 199.000 | | |

Valid Cases 5 Missing Cases 4

---



SAMPLE_2 Sample #2

| Value Label | Value | Frequency | Percent | Valid Percent | Cum Percent |
|---|---|---|---|---|---|
| | 1 | 1 | 11.1 | 11.1 | 11.1 |
| | 2 | 1 | 11.1 | 11.1 | 22.2 |
| | 3 | 1 | 11.1 | 11.1 | 33.3 |
| | 4 | 1 | 11.1 | 11.1 | 44.4 |
| | 7 | 1 | 11.1 | 11.1 | 55.6 |
| | 10 | 1 | 11.1 | 11.1 | 66.7 |
| | 80 | 1 | 11.1 | 11.1 | 77.8 |
| | 96 | 1 | 11.1 | 11.1 | 88.9 |
| | 100 | 1 | 11.1 | 11.1 | 100.0 |
| | TOTAL | 9 | 100.0 | 100.0 | |

---



SAMPLE_2 Sample #2

| | | | | | |
|---|---|---|---|---|---|
| Mean | 33.667 | Std Err | 14.717 | Median | 7.000 |
| Mode | 1.000 | Std Dev | 44.150 | Variance | 1949.250 |
| Kurtosis | -1.492 | S E Kurt | 1.400 | Skewness | .896 |
| S E Skew | .717 | Range | 99.000 | Minimum | 1.000 |
| Maximum | 100.000 | Sum | 303.000 | | |

Valid Cases 9 Missing Cases 0

---



SAMPLE_3 Sample #3

| | | Valid | Cum |
|---|---|---|---|

| Value Label | Value | Frequency | Percent | Percent | Percent |
|---|---|---|---|---|---|
| | 2 | 1 | 11.1 | 12.5 | 12.5 |
| | 4 | 1 | 11.1 | 12.5 | 25.0 |
| | 7 | 1 | 11.1 | 12.5 | 37.5 |
| | 30 | 2 | 22.2 | 25.0 | 62.5 |
| | 42 | 1 | 11.1 | 12.5 | 75.0 |
| | 80 | 1 | 11.1 | 12.5 | 87.5 |
| | 100 | 1 | 11.1 | 12.5 | 100.0 |
| | 999 | 1 | 11.1 | MISSING | |
| | TOTAL | 9 | 100.0 | 100.0 | |

| | | | | | |
|---|---|---|---|---|---|
| Mean | 36.875 | Std Err | 12.786 | Median | 30.000 |
| Mode | 30.000 | Std Dev | 36.164 | Variance | 1307.839 |
| Kurtosis | -.333 | S E Kurt | 1.481 | Skewness | .913 |
| S E Skew | .752 | Range | 98.000 | Minimum | 2.000 |
| Maximum | 100.000 | Sum | 295.000 | | |

Valid Cases 8 Missing Cases 1

This procedure was completed at 14:21:02

---



```
Finish
Next command's output on page   1
Include 'mean-sd.dat'.
* Test:       Descriptive Statistics
*
* Author:     Thomas W. MacFarland, Ed.D.
*
* Source:     McClave, James T., and Frank H. Dietrich, II.
*                  STATISTICS, 4th edition.  San Francisco,
*                  California:  Dellen Publishing Company, 1988.
*                  ISBN 0-02-379260-4  Page 48
*
* Software:   SPSS/PC+ Studentware
*
* Scenario:   Based on data provided in Table 1, determine the
*             following for each sample:
*
*             1.  Median
*
*             2.  Mean
*
*             3.  Standard Deviation
*
*
*                                 Table 1
*
*                             Summary Data
```

```
[*
[*
[*
[*
[*                Sample #1          Sample #2          Sample #3
[*
[*
[*                  0039               0100               0100
[*                  0042               0004               0004
[*                  0040               0007               0007
[*                  0037               0096               0030
[*                  0041               0080               0080
[*                                     0003               0030
[*                                     0001               0042
[*                                     0010               0002
[*                                     0002
[*
[*
[*  Note:         Use the MISSING VALUE command so that all samples
[*                can be retained in the same file.
[*
[*  Answer:       Answer(s) can be found in mean-sd.lis.
[*
[*                Be sure to rename spss.lis to mean-sd.lis.
[
[DATA LIST /
[     Sample_1 01-04
[     Sample_2 06-09
[     Sample_3 11-14.
[
[VARIABLE LABELS
[     Sample_1 "Sample #1"
[     Sample_2 "Sample #2"
[     Sample_3 "Sample #3".
[
[MISSING VALUE Sample_1 (0999) Sample_2 (0999) Sample_3 (0999).
[
[BEGIN DATA.
[0039 0100 0100
[0042 0004 0004
[0040 0007 0007
[0037 0096 0030
[0041 0080 0080
[0999 0003 0030
[0999 0001 0042
[0999 0010 0002
[0999 0002 0999
[END DATA.
FREQUENCIES VARIABLES = Sample_1 Sample_2 Sample_3 / STATISTICS ALL.
[Next command's output on page   6
finish
```

Test: Student's t-test with two independent samples

Author: Thomas W. MacFarland, Ed.D.

Source: Joseph, Marjory L., and William D. Joseph. RESEARCH FUNDAMENTALS IN HOME ECONOMICS. Redondo Beach, California: Plycon Press, 1979. ISBN 0-8087-3415-6 Page 182

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there are true differences (alpha = .05) between Group #1 and Group #2.

Table 1

Summary Data

| Group #1 | | | | Group #2 | | | |
|---|---|---|---|---|---|---|---|
| 36 | 35 | 39 | 46 | 26 | 27 | 37 | 29 |
| 31 | 36 | 29 | 31 | 38 | 36 | 29 | 36 |
| 43 | 38 | 33 | 32 | 33 | 24 | 22 | 28 |
| 42 | 47 | 47 | 36 | 25 | 31 | 31 | 30 |

Note: In addition, calculate descriptive statistics for each group.

Ho: There is no difference between Group #1 and Group #2 (alpha = .05).

Answer: Answer(s) can be found in t_inep.lis. Briefly,

Computed t = 3.89

Criterion t = 1.697 (alpha = .05, df = 30)

Computed t (3.89) > Criterion t (1.697)

Reject Ho ..... differences are significant

Be sure to rename spss.lis to t_inep.lis.

```
DATA LIST /
     Group     01
```

```
     Score  03-04.

VARIABLE LABELS
     Group     "Group:  Group 1 or Group 2"
     Score     "Measured Datum".

VALUE LABELS
     Group     1 'Group #1'
               2 'Group #2'.

BEGIN DATA.
1 36
1 35
1 39
1 46
1 31
1 36
1 29
1 31
1 43
1 38
1 33
1 32
1 42
1 47
1 47
1 36
2 26
2 27
2 37
2 29
2 38
2 36
2 29
2 36
2 33
2 24
2 22
2 28
2 25
2 31
2 31
2 30
END DATA.
                              SPSS/PC+ Studentware                    11/26/89
include 't_inep.dat'.
*  Test:       Student's t-test with two independent samples
*
*  Author:     Thomas W. MacFarland, Ed.D.
*
*  Source:     Joseph, Marjory L., and William D. Joseph.
*                   RESEARCH FUNDAMENTALS IN HOME ECONOMICS.
```

```
*                Redondo Beach, California:  Plycon Press,
*                1979.  ISBN 0-8087-3415-6  Page 182
*
*  Software:     SPSS/PC+ Studentware
*
*  Scenario:     Based on data provided in Table 1, determine if
*                there are true differences (alpha = .05) between
*                Group #1 and Group #2.
*
*                                Table 1
*
*                            Summary Data
*
*                ------------------------------------------------
*                ------------------------------------------------
*                     Group #1                    Group #2
*                ------------------------------------------------
*                36   35   39   46              26   27   37   29
*                31   36   29   31              38   36   29   36
*                43   38   33   32              33   24   22   28
*                42   47   47   36              25   31   31   30
*                ------------------------------------------------
*
*  Note:         In addition, calculate descriptive statistics for
*                each group.
*
*  Ho:           There is no difference between Group #1 and Group
*                #2 (alpha = .05).
*
*  Answer:       Answer(s) can be found in t_inep.lis.  Briefly,
*
*                Computed  t  = 3.89
*
*                Criterion t  = 1.697 (alpha = .05, df = 30)
*
*                Computed t (3.89) > Criterion t (1.697)
*
*                Reject Ho ..... differences are significant
*
*                Be sure to rename spss.lis to t_inep.lis.

DATA LIST /
     Group      01
     Score   03-04.

VARIABLE LABELS
     Group      "Group:  Group 1 or Group 2"
     Score      "Measured Datum".
```

```
VALUE LABELS
     Group      1 'Group #1'
                2 'Group #2'.

BEGIN DATA.
END DATA.
     32 cases are written to the compressed active file.

This procedure was completed at 14:37:13
T-TEST GROUPS = Group (1,2) / VARIABLES = Score.
```

---



Independent samples of GROUP Group: Group 1 or Group 2

Group 1: GROUP EQ 1 Group 2: GROUP EQ 2

t-test for: SCORE Measured Datum

| | Number of Cases | Mean | Standard Deviation | Standard Error |
|---|---|---|---|---|
| Group 1 | 16 | 37.5625 | 5.921 | 1.480 |
| Group 2 | 16 | 30.1250 | 4.843 | 1.211 |

| | | Pooled Variance Estimate | | | Separate Variance Estimate | | |
|---|---|---|---|---|---|---|---|
| F Value | 2-Tail Prob. | t Value | Degrees of Freedom | 2-Tail Prob. | t Value | Degrees of Freedom | 2-Tail Prob. |
| 1.50 | .445 | 3.89 | 30 | .001 | 3.89 | 28.86 | .001 |

This procedure was completed at 14:40:06

---



```
finish
[Next command's output on page   1
include 't_inep.dat'.
[*  Test:      Student's t-test with two independent samples
[*
[*  Author:    Thomas W. MacFarland, Ed.D.
[*
[*  Source:    Joseph, Marjory L., and William D. Joseph.
[*                 RESEARCH FUNDAMENTALS IN HOME ECONOMICS.
[*                 Redondo Beach, California:  Plycon Press,
[*                 1979.  ISBN 0-8087-3415-6  Page 182
[*
[*  Software:  SPSS/PC+ Studentware
[*
[*  Scenario:  Based on data provided in Table 1, determine if
```

```
[*              there are true differences (alpha = .05) between
[*              Group #1 and Group #2.
[*
[*
[*                                   Table 1
[*
[*                                Summary Data
[*
[*
[*
[*
[*
[*
[*                  Group #1                          Group #2
[*
[*              36   35   39   46                26   27   37   29
[*              31   36   29   31                38   36   29   36
[*              43   38   33   32                33   24   22   28
[*              42   47   47   36                25   31   31   30
[*
[*
[*  Note:       In addition, calculate descriptive statistics for
[*              each group.
[*
[*  Ho:         There is no difference between Group #1 and Group
[*              #2 (alpha = .05).
[*
[*  Answer:     Answer(s) can be found in t_inep.lis.  Briefly,
[*
[*              Computed  t  = 3.89
[*
[*              Criterion t  = 1.697 (alpha = .05, df = 30)
[*
[*              Computed t (3.89) > Criterion t (1.697)
[*
[*              Reject Ho ..... differences are significant
[*
[*              Be sure to rename spss.lis to t_inep.lis.
[
[DATA LIST /
[     Group     01
[     Score  03-04.
[
[VARIABLE LABELS
[     Group     "Group:  Group 1 or Group 2"
[     Score     "Measured Datum".
[
[VALUE LABELS
[     Group     1 'Group #1'
[               2 'Group #2'.
[
[BEGIN DATA.
[1 36
```

```
 [1 35
 [1 39
 [1 46
 [1 31
 [1 36
 [1 29
 [1 31
 [1 43
 [1 38
 [1 33
 [1 32
 [1 42
 [1 47
 [1 47
 [1 36
 [2 26
 [2 27
 [2 37
 [2 29
 [2 38
 [2 36
 [2 29
 [2 36
 [2 33
 [2 24
 [2 22
 [2 28
 [2 25
 [2 31
 [2 31
 [2 30
[END DATA.
T-TEST GROUPS = Group (1,2) / VARIABLES = Score.
[Next command's output on page    3
finish
```

Test: Student's t-test with a paired sample

Author: Thomas W. MacFarland, Ed.D.

Source: Joseph, Marjory L., and William D. Joseph. RESEARCH FUNDAMENTALS IN HOME ECONOMICS. Redondo Beach, California: Plycon Press, 1979. ISBN 0-8087-3415-6 Page 190

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there are true differences (alpha = .05) between Method #1 and Method #2.

Table 1

Summary Data

| Pair | Method #1 | Method #2 |
|---|---|---|
| 01 | 27 | 21 |
| 02 | 22 | 20 |
| 03 | 18 | 16 |
| 04 | 26 | 19 |
| 05 | 19 | 16 |
| 06 | 18 | 16 |
| 07 | 24 | 18 |
| 08 | 16 | 12 |
| 09 | 14 | 10 |
| 10 | 13 | 16 |
| 11 | 13 | 12 |
| 12 | 12 | 10 |

Note: In addition, calculate descriptive statistics for

```
*              each method.
*
*  Ho:         There is no difference between Method #1 and
*              Method #2 (alpha = .05).
*
*  Answer:     Answer(s) can be found in t_pair.lis.  Briefly,
*
*              Computed  t  = 3.85
*
*              Criterion t  = 1.796 (alpha = .05, df = 11)
*
*              Computed t (3.85) > Criterion t (1.796)
*
*              Reject Ho ..... differences are significant
*
*              Be sure to rename spss.lis to t_pair.lis.

DATA LIST /
     Pair     01-02
     Method_1 04-05
     Method_2 07-08.

VARIABLE LABELS
     Pair     "Matched Pair: S1 to M_#1; S2 to M_#2"
     Method_1 "Score for Subject Assigned to Method #1"
     Method_2 "Score for Subject Assigned to Method #2".

BEGIN DATA.
01 27 21
02 22 20
03 18 16
04 26 19
05 19 16
06 18 16
07 24 18
08 16 12
09 14 10
10 13 16
11 13 12
12 12 10
END DATA.
```



```
include 't_pair.dat'.
*  Test:       Student's t-test with a paired sample
*
*  Author:     Thomas W. MacFarland, Ed.D.
*
*  Source:     Joseph, Marjory L., and William D. Joseph.
*                   RESEARCH FUNDAMENTALS IN HOME ECONOMICS.
*                   Redondo Beach, California:  Plycon Press,
*                   1979.  ISBN 0-8087-3415-6  Page 190
```

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there are true differences (alpha = .05) between Method #1 and Method #2.

Table 1

Summary Data

| Pair | Method #1 | Method #2 |
|---|---|---|
| 01 | 27 | 21 |
| 02 | 22 | 20 |
| 03 | 18 | 16 |
| 04 | 26 | 19 |
| 05 | 19 | 16 |
| 06 | 18 | 16 |
| 07 | 24 | 18 |
| 08 | 16 | 12 |
| 09 | 14 | 10 |
| 10 | 13 | 16 |
| 11 | 13 | 12 |
| 12 | 12 | 10 |

Note: In addition, calculate descriptive statistics for each method.

Ho: There is no difference between Method #1 and Method #2 (alpha = .05).

Answer: Answer(s) can be found in t_pair.lis. Briefly,

Computed t = 3.85

```
*
*              Criterion t  = 1.796 (alpha = .05, df = 11)
*
*              Computed t (3.85) > Criterion t (1.796)
*
*              Reject Ho ..... differences are significant
*
*              Be sure to rename spss.lis to t_pair.lis.

DATA LIST /
     Pair     01-02
     Method_1 04-05
     Method_2 07-08.

VARIABLE LABELS
     Pair     "Matched Pair: S1 to M_#1; S2 to M_#2"
     Method_1 "Score for Subject Assigned to Method #1"
     Method_2 "Score for Subject Assigned to Method #2".

BEGIN DATA.
END DATA.
     12 cases are written to the compressed active file.

This procedure was completed at 14:57:23

T-TEST PAIRS = Method_1 Method_2.
------------------------------------------------------------------------------
Page   2                    SPSS/PC+ Studentware                      11/26/89


Paired samples t-test:  METHOD_1  Score for Subject Assigned to Method #1
                        METHOD_2  Score for Subject Assigned to Method #2

Variable     Number                    Standard    Standard
           of Cases      Mean         Deviation     Error

METHOD_1       12      18.5000          5.231       1.510
METHOD_2       12      15.5000          3.754       1.084


(Difference) Standard    Standard  3        2-Tail 3    t     Degrees of  2-Tail
     Mean    Deviation     Error   3  Corr. Prob.  3  Value     Freedom    Prob.
                                   3               3
    3.0000      2.697       .778  3   .870  .000  3   3.85        11       .003

This procedure was completed at 14:59:22
finish
[Next command's output on page   1
include 't_pair.dat'.
[*  Test:      Student's t-test with a paired sample
[*
[*  Author:    Thomas W. MacFarland, Ed.D.
```

[* Source: Joseph, Marjory L., and William D. Joseph. RESEARCH FUNDAMENTALS IN HOME ECONOMICS. Redondo Beach, California: Plycon Press, 1979. ISBN 0-8087-3415-6 Page 190

[* Software: SPSS/PC+ Studentware

[* Scenario: Based on data provided in Table 1, determine if there are true differences (alpha = .05) between Method #1 and Method #2.

Table 1

Summary Data

| Pair | Method #1 | Method #2 |
|---|---|---|
| 01 | 27 | 21 |
| 02 | 22 | 20 |
| 03 | 18 | 16 |
| 04 | 26 | 19 |
| 05 | 19 | 16 |
| 06 | 18 | 16 |
| 07 | 24 | 18 |
| 08 | 16 | 12 |
| 09 | 14 | 10 |
| 10 | 13 | 16 |
| 11 | 13 | 12 |
| 12 | 12 | 10 |

[* Note: In addition, calculate descriptive statistics for each method.

[* Ho: There is no difference between Method #1 and

```
[*              Method #2 (alpha = .05).
[*
[*  Answer:     Answer(s) can be found in t_pair.lis.  Briefly,
[*
[*              Computed  t  = 3.85
[*
[*              Criterion t  = 1.796 (alpha = .05, df = 11)
[*
[*              Computed t (3.85) > Criterion t (1.796)
[*
[*              Reject Ho ..... differences are significant
[*
[*              Be sure to rename spss.lis to t_pair.lis.
[
[DATA LIST /
[     Pair      01-02
[     Method_1  04-05
[     Method_2  07-08.
[
[VARIABLE LABELS
[     Pair      "Matched Pair: S1 to M_#1; S2 to M_#2"
[     Method_1  "Score for Subject Assigned to Method #1"
[     Method_2  "Score for Subject Assigned to Method #2".
[
[BEGIN DATA.
[01 27 21
[02 22 20
[03 18 16
[04 26 19
[05 19 16
[06 18 16
[07 24 18
[08 16 12
[09 14 10
[10 13 16
[11 13 12
[12 12 10
[END DATA.
[
T-TEST PAIRS = Method_1 Method_2.
[Next command's output on page   3
finish
```

**Test:** Chi-square (using all data)

**Author:** Thomas W. MacFarland, Ed.D.

**Source:** McClave, James T., and Frank H. Dietrich, II. STATISTICS, 4th edition. San Francisco, California: Dellen Publishing Company, 1988. ISBN 0-02-379260-4 Page 664

**Software:** SPSS/PC+ Studentware

**Scenario:** Based on data provided in Table 1, determine if there are true differences (alpha = .05) between type of response and type of commitment to a staged crime.

Table 1

Summary Data

| | Commitment | |
|---|---|---|
| | Committed | Not Committed |
| Response | | |
| Intervened | 26 | 6 |
| Did Not Intervene | 13 | 34 |

Note. For this analysis the following codes are used:

Intervened and Committed ..... 1 1

Intervened and Not Committed ..... 1 2

Did Not Intervene and Committed ..... 2 1

Did Not Intervene and Not Committed ... 2 2

**Ho:** There is no difference between degree of commitment to victim and response to a staged crime (alpha = .05).

```
*  Answer:     Answer(s) can be found in chi-fq.lis.  Briefly,
*
*              Computed  chi = 19.78
*
*              Criterion chi =  3.84 (alpha = .05, df = 1)
*
*              Computed chi (19.78) > Criterion chi (3.84)
*
*              Reject Ho ..... differences are significant
*
*              Be sure to rename spss.lis to chi-fq.lis.

DATA LIST /
    Response  1
    Commit_t  3.

VARIABLE LABELS
     Response "Response by Bystander to a Staged Crime"
     Commit_t "Extent of Commitment to the Victim".

VALUE LABELS
     Response 1 'Intervened'
              2 'Did Not Intervene' /
     Commit_t 1 'Committed'
              2 'Not Committed'.

BEGIN DATA.
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
1 1
```

```
2 2
2 2
END DATA.
                              SPSS/PC+ Studentware                    11/26/89
include 'chi-fq.dat'.
* Test:      Chi-square (using all data)
*
* Author:    Thomas W. MacFarland, Ed.D.
*
* Source:    McClave, James T., and Frank H. Dietrich, II.
*                 STATISTICS, 4th edition.  San Francisco,
*                 California:  Dellen Publishing Company, 1988.
*                 ISBN 0-02-379260-4  Page 664
*
* Software:  SPSS/PC+ Studentware
*
* Scenario:  Based on data provided in Table 1, determine if
*            there are true differences (alpha = .05) between
*            type of response and type of commitment to a
*            staged crime.
*
*
*                                  Table 1
*
*                              Summary Data
*
*
*
```

```
*
*  Ho:        There is no difference between degree of commitment
*             to victim and response to a staged crime (alpha =
*             .05).
*
*  Answer:    Answer(s) can be found in chi-fq.lis.  Briefly,
*
*             Computed  chi = 19.78
*
*             Criterion chi =  3.84 (alpha = .05, df = 1)
*
*             Computed chi (19.78) > Criterion chi (3.84)
*
*             Reject Ho ..... differences are significant
*
*             Be sure to rename spss.lis to chi-fq.lis.

DATA LIST /
    Response  1
    Commit_t  3.

VARIABLE LABELS
     Response "Response by Bystander to a Staged Crime"
     Commit_t "Extent of Commitment to the Victim".

VALUE LABELS
     Response 1 'Intervened'
              2 'Did Not Intervene' /
     Commit_t 1 'Committed'
              2 'Not Committed'.

BEGIN DATA.
END DATA.
     79 cases are written to the compressed active file.

This procedure was completed at 15:22:20
CROSSTABS TABLES = Response by Commit_t / OPTIONS 14 15 / STATISTICS 1.


 ***** Given WORKSPACE allows for  3412 Cells with
     2 Dimensions for CROSSTAB problem *****


--------------------------------------------------------------------------------
Page   2                       SPSS/PC+ Studentware                    11/26/89

Crosstabulation:      RESPONSE  Response by Bystander to a Staged Crime
                   By COMMIT_T  Extent of Commitment to the Victim

            Count  |Committe|Not Comm|
COMMIT_TD>  Exp Val|d       |itted   |  Row
            Residual|     1 |      2 | Total
```

| RESPONSE | | | |
|---|---|---|---|
| 1 | 26 | 6 | 32 |
| Intervened | 15.8 | 16.2 | 40.5% |
| | 10.2 | -10.2 | |
| 2 | 13 | 34 | 47 |
| Did Not Interven | 23.2 | 23.8 | 59.5% |
| | -10.2 | 10.2 | |
| Column Total | 39 | 40 | 79 |
| | 49.4% | 50.6% | 100.0% |

| Chi-Square | D.F. | Significance | Min E.F. | Cells with E.F.< 5 |
|---|---|---|---|---|
| 19.78240 | 1 | .0000 | 15.797 | None |
| 21.87383 | 1 | .0000 | ( Before Yates Correction ) | |

Number of Missing Observations = 0

---



```
This procedure was completed at 15:24:43
finish
[Next command's output on page   1
include 'chi-fq.dat'.
[*  Test:      Chi-square (using all data)
[*
[*  Author:    Thomas W. MacFarland, Ed.D.
[*
[*  Source:    McClave, James T., and Frank H. Dietrich, II.
[*                  STATISTICS, 4th edition.  San Francisco,
[*                  California:  Dellen Publishing Company, 1988.
[*                  ISBN 0-02-379260-4  Page 664
[*
[*  Software:  SPSS/PC+ Studentware
[*
[*  Scenario:  Based on data provided in Table 1, determine if
[*             there are true differences (alpha = .05) between
[*             type of response and type of commitment to a
[*             staged crime.
[*
[*
[*                                  Table 1
[*
[*                              Summary Data
[*
[*             ____________________________________________________
[*             ____________________________________________________
[*
[*                                                  Commitment
```

```
*
*
*
```

```
[
[BEGIN DATA.
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
[1 1
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[2 1
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[2 1
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[2 2
[2 2
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```

```
[2  2
[2  2
[2  2
[2  2
[2  2
[2  2
[2  2
[2  2
[2  2
[2  2
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[2  2
[2  2
[2  2
[2  2
[2  2
[2  2
[2  2
[2  2
[2  2
[2  2
[END DATA.
CROSSTABS TABLES = Response by Commit_t / OPTIONS 14 15 / STATISTICS 1.
[Next command's output on page    4
finish
```

* Test: Chi-square (using WEIGHT, to avoid extra keying)
*
* Author: Thomas W. MacFarland, Ed.D.
*
* Source: McClave, James T., and Frank H. Dietrich, II.
* STATISTICS, 4th edition. San Francisco,
* California: Dellen Publishing Company, 1988.
* ISBN 0-02-379260-4 Page 650
*
* Software: SPSS/PC+ Studentware
*
* Scenario: Based on data provided in Table 1, determine if
* there are true differences (alpha = .05) between
* car size and manufacturer.

Table 1

Summary Data

| | | Manufacturer | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| Car Size | Small | 157 | 65 | 181 | 10 |
| | Intermediate | 126 | 82 | 142 | 46 |
| | Large | 58 | 45 | 60 | 28 |

Note. For this analysis the following codes are used:

Small Car and Manufacturer A ..... 1 1

Small Car and Manufacturer B ..... 1 2

Small Car and Manufacturer C ..... 1 3

Small Car and Manufacturer D ..... 1 4

Intermediate Car and Manufacturer A ... 2 1

Intermediate Car and Manufacturer B ... 2 2

Intermediate Car and Manufacturer C ... 2 3

```
*
*                    Intermediate Car and Manufacturer D ... 2 4
*
*                    Large Car and Manufacturer A ..... 3 1
*
*                    Large Car and Manufacturer B ..... 3 2
*
*                    Large Car and Manufacturer C ..... 3 3
*
*                    Large Car and Manufacturer D ..... 3 4
*
*  Ho:          There is no difference between car size amd type
*               of manufacturer (alpha = .05).
*
*  Answer:      Answer(s) can be found in chi-wt.lis.  Briefly,
*
*               Computed  chi  = 45.81
*
*               Criterion chi  = 12.59 (alpha = .05, df = 6)
*
*               Computed chi = (45.81) > Criterion chi (12.59)
*
*               Reject Ho ..... differences are significant
*
*               Be sure to rename spss.lis to chi-wt.lis.

DATA LIST /
     Freq      01-03
     Car          05
     Manuf_er     07.

WEIGHT by Freq.

VARIABLE LABELS
     Freq      "Summative Frequency Count"
     Car       "Type (e.g., size) of Car"
     Manuf_er "Manufacturer".

VALUE LABELS
     Car       1 'Small'  2 'Intermediate' 3 'Large' /
     Manuf_er 1 'A'       2 'B'            3 'C'     4 'D'.

BEGIN DATA.
157 1 1
065 1 2
181 1 3
010 1 4
126 2 1
082 2 2
142 2 3
046 2 4
058 3 1
```

```
045 3 2
060 3 3
028 3 4
END DATA.
```

SPSS/PC+ Studentware 11/26/89

```
include 'chi-wt.dat'.
* Test:      Chi-square (using WEIGHT, to avoid extra keying)
*
* Author:    Thomas W. MacFarland, Ed.D.
*
* Source:    McClave, James T., and Frank H. Dietrich, II.
*                 STATISTICS, 4th edition.  San Francisco,
*                 California:  Dellen Publishing Company, 1988.
*                 ISBN 0-02-379260-4  Page 650
*
* Software:  SPSS/PC+ Studentware
*
* Scenario:  Based on data provided in Table 1, determine if
*            there are true differences (alpha = .05) between
*            car size and manufacturer.
```

Table 1

Summary Data

| | | Manufacturer | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| Car Size | Small | 157 | 65 | 181 | 10 |
| | Intermediate | 126 | 82 | 142 | 46 |
| | Large | 58 | 45 | 60 | 28 |

Note. For this analysis the following codes are used:

Small Car and Manufacturer A ..... 1 1

Small Car and Manufacturer B ..... 1 2

Small Car and Manufacturer C ..... 1 3

```
*                    Small Car and Manufacturer D ..... 1 4
*
*                    Intermediate Car and Manufacturer A ... 2 1
*
*                    Intermediate Car and Manufacturer B ... 2 2
*
*                    Intermediate Car and Manufacturer C ... 2 3
*
*                    Intermediate Car and Manufacturer D ... 2 4
*
*                    Large Car and Manufacturer A ..... 3 1
*
*                    Large Car and Manufacturer B ..... 3 2
*
*                    Large Car and Manufacturer C ..... 3 3
*
*                    Large Car and Manufacturer D ..... 3 4
*
*  Ho:          There is no difference between car size amd type
*               of manufacturer (alpha = .05).
*
*  Answer:      Answer(s) can be found in chi-wt.lis.  Briefly,
*
*               Computed  chi  = 45.81
*
*               Criterion chi  = 12.59 (alpha = .05, df = 6)
*
*               Computed chi = (45.81) > Criterion chi (12.59)
*
*               Reject Ho ..... differences are significant
*
*               Be sure to rename spss.lis to chi-wt.lis.

DATA LIST /
     Freq      01-03
     Car          05
     Manuf_er     07.

WEIGHT by Freq.

VARIABLE LABELS
     Freq      "Summative Frequency Count"
     Car       "Type (e.g., size) of Car"
     Manuf_er "Manufacturer".

VALUE LABELS
     Car       1 'Small'  2 'Intermediate' 3 'Large' /
     Manuf_er 1 'A'       2 'B'            3 'C'     4 'D'.

BEGIN DATA.
END DATA.
     12 cases are written to the compressed active file.
```

```
This procedure was completed at 15:45:40

CROSSTABS TABLES = Car by Manuf_er / OPTIONS 14 15 / STATISTICS 1.

 ***** Given WORKSPACE allows for  3412 Cells with
     2 Dimensions for CROSSTAB problem *****
```

---



Crosstabulation: CAR Type (e.g., size) of Car
By MANUF_ER Manufacturer

| MANUF_ERD> / CAR | Count / Exp Val / Residual | A 1 | B 2 | C 3 | D 4 | Row Total |
|---|---|---|---|---|---|---|
| Small | 1 | 157 | 65 | 181 | 10 | 413 |
| | | 140.8 | 79.3 | 158.2 | 34.7 | 41.3% |
| | | 16.2 | -14.3 | 22.8 | -24.7 | |
| Intermediate | 2 | 126 | 82 | 142 | 46 | 396 |
| | | 135.0 | 76.0 | 151.7 | 33.3 | 39.6% |
| | | -9.0 | 6.0 | -9.7 | 12.7 | |
| Large | 3 | 58 | 45 | 60 | 28 | 191 |
| | | 65.1 | 36.7 | 73.2 | 16.0 | 19.1% |
| | | -7.1 | 8.3 | -13.2 | 12.0 | |
| | Column Total | 341 | 192 | 383 | 84 | 1000 |
| | | 34.1% | 19.2% | 38.3% | 8.4% | 100.0% |

---



| Chi-Square | D.F. | Significance | Min E.F. | Cells with E.F.< 5 |
|---|---|---|---|---|
| 45.81247 | 6 | .0000 | 16.044 | None |

```
Number of Missing Observations =       0

This procedure was completed at 15:47:33
finish
[Next command's output on page   1
include 'chi-wt.dat'.
[*  Test:      Chi-square (using WEIGHT, to avoid extra keying)
[*
[*  Author:    Thomas W. MacFarland, Ed.D.
```

Source: McClave, James T., and Frank H. Dietrich, II. STATISTICS, 4th edition. San Francisco, California: Dellen Publishing Company, 1988. ISBN 0-02-379260-4 Page 650

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there are true differences (alpha = .05) between car size and manufacturer.

Table 1

Summary Data

| | | Manufacturer | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| Car Size | Small | 157 | 65 | 181 | 10 |
| | Intermediate | 126 | 82 | 142 | 46 |
| | Large | 58 | 45 | 60 | 28 |

Note. For this analysis the following codes are used:

Small Car and Manufacturer A ..... 1 1

Small Car and Manufacturer B ..... 1 2

Small Car and Manufacturer C ..... 1 3

Small Car and Manufacturer D ..... 1 4

Intermediate Car and Manufacturer A ... 2 1

Intermediate Car and Manufacturer B ... 2 2

Intermediate Car and Manufacturer C ... 2 3

Intermediate Car and Manufacturer D ... 2 4

```
[*                    Large Car and Manufacturer A ..... 3 1
[*
[*                    Large Car and Manufacturer B ..... 3 2
[*
[*                    Large Car and Manufacturer C ..... 3 3
[*
[*                    Large Car and Manufacturer D ..... 3 4
[*
[*  Ho:          There is no difference between car size amd type
[*               of manufacturer (alpha = .05).
[*
[*  Answer:      Answer(s) can be found in chi-wt.lis.  Briefly,
[*
[*               Computed  chi  = 45.81
[*
[*               Criterion chi  = 12.59 (alpha = .05, df = 6)
[*
[*               Computed chi = (45.81) > Criterion chi (12.59)
[*
[*               Reject Ho ..... differences are significant
[*
[*               Be sure to rename spss.lis to chi-wt.lis.
[
[DATA LIST /
[     Freq      01-03
[     Car          05
[     Manuf_er     07.
[
[WEIGHT by Freq.
[
[VARIABLE LABELS
[     Freq      "Summative Frequency Count"
[     Car       "Type (e.g., size) of Car"
[     Manuf_er "Manufacturer".
[
[VALUE LABELS
[     Car       1 'Small'  2 'Intermediate' 3 'Large' /
[     Manuf_er 1 'A'       2 'B'             3 'C'     4 'D'.
[
[BEGIN DATA.
[157 1 1
[065 1 2
[181 1 3
[010 1 4
[126 2 1
[082 2 2
[142 2 3
[046 2 4
[058 3 1
[045 3 2
[060 3 3
[028 3 4
```

```
[END DATA.
[
CROSSTABS TABLES = Car by Manuf_er / OPTIONS 14 15 / STATISTICS 1.
[Next command's output on page    4
finish
```

Test: Pearson's product-moment coefficient of correlation

Author: Thomas W. MacFarland, Ed.D.

Source: McClave, James T., and Frank H. Dietrich, II. STATISTICS, 4th edition. San Francisco, California: Dellen Publishing Company, 1988. ISBN 0-02-379260-4 Page 719

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there is a correlation (alpha = .05) between number of games won (baseball) and team batting average. (American League teams from the 1986 season will serve as the example for this exercise).

Table 1

Summary Data

| Team | Number of Games Won | Team Batting Average |
|---|---|---|
| Cleveland | 84 | .284 |
| New York | 90 | .271 |
| Boston | 95 | .271 |
| Toronto | 86 | .269 |
| Texas | 87 | .267 |
| Detroit | 87 | .263 |
| Minnesota | 71 | .261 |
| Baltimore | 73 | .258 |
| California | 92 | .255 |
| Milwaukee | 77 | .255 |
| Seattle | 67 | .253 |

```
*              Kansas City                76              .252
*
*              Oakland                    76              .252
*
*              Chicago                    72              .247
*
*
*  Ho:         There is no association between number of games won
*              and team batting average (alpha = .05).
*
*  Answer:     Answer(s) can be found in pearson.lis.  Briefly,
*
*              Computed  r  = .600
*
*              Criterion r  = .458 (alpha = .05, n = 14)
*
*              Computed r (.600) > Criterion r (.458)
*
*              Reject Ho ..... the association is significant
*
*              Be sure to rename spss.lis to pearson.lis.
*
*  Note:       Use (a) to signify an alphabetical string when key-
*              ing baseball teams.

DATA LIST /
     Team      01-20 (a)
     G_Won     22-23
     TBA       25-28.

VARIABLE LABELS
     Team      "American League, 1986 Season"
     G_Won     "Number of Games Won"
     TBA       "Team Batting Average".

BEGIN DATA.
Cleveland            84 .284
New_York             90 .271
Boston               95 .271
Toronto              86 .269
Texas                87 .267
Detroit              87 .263
Minnesota            71 .261
Baltimore            73 .258
California           92 .255
Milwaukee            77 .255
Seattle              67 .253
Kansas_City          76 .252
Oakland              76 .252
Chicago              72 .247
END DATA.
```

```
include 'pearson.dat'.
*  Test:       Pearson's product-moment coefficient of
*              correlation
*
*  Author:     Thomas W. MacFarland, Ed.D.
*
*  Source:     McClave, James T., and Frank H. Dietrich, II.
*                   STATISTICS, 4th edition.  San Francisco,
*                   California:  Dellen Publishing Company, 1988.
*                   ISBN 0-02-379260-4  Page 719
*
*  Software:   SPSS/PC+ Studentware
*
*  Scenario:   Based on data provided in Table 1, determine if
*              there is a correlation (alpha = .05) between number
*              of games won (baseball) and team batting average.
*              (American League teams from the 1986 season will
*              serve as the example for this exercise).
```

Table 1

Summary Data

| Team | Number of Games Won | Team Batting Average |
|---|---|---|
| Cleveland | 84 | .284 |
| New York | 90 | .271 |
| Boston | 95 | .271 |
| Toronto | 86 | .269 |
| Texas | 87 | .267 |
| Detroit | 87 | .263 |
| Minnesota | 71 | .261 |
| Baltimore | 73 | .258 |
| California | 92 | .255 |
| Milwaukee | 77 | .255 |
| Seattle | 67 | .253 |

```
*
*              Kansas City                76              .252
*
*              Oakland                    76              .252
*
*              Chicago                    72              .247
*
*
*  Ho:         There is no association between number of games won
*              and team batting average (alpha = .05).
*
*  Answer:     Answer(s) can be found in pearson.lis.  Briefly,
*
*              Computed  r  = .600
*
*              Criterion r  = .458 (alpha = .05, n = 14)
*
*              Computed r (.600) > Criterion r (.458)
*
*              Reject Ho ..... the association is significant
*
*              Be sure to rename spss.lis to pearson.lis.
*
*  Note:       Use (a) to signify an alphabetical string when key-
*              ing baseball teams.

DATA LIST /
     Team      01-20 (a)
     G_Won     22-23
     TBA       25-28.

VARIABLE LABELS
     Team      "American League, 1986 Season"
     G_Won     "Number of Games Won"
     TBA       "Team Batting Average".

BEGIN DATA.
END DATA.
     14 cases are written to the compressed active file.

This procedure was completed at 16:20:18
CORRELATION VARIABLES = G_Won with TBA / OPTIONS 3 5 / STATISTICS 1.
```

---

Page 2 SPSS/PC+ Studentware 11/26/89

| Variable | Cases | Mean | Std Dev |
|---|---|---|---|
| G_WON | 14 | 80.9286 | 8.8184 |
| TBA | 14 | .2613 | .0101 |

---

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```
Correlations:  TBA

  G_WON          .6003
                (   14)
                P= .023


(Coefficient / (Cases) / 2-tailed Significance)

" . " is printed if a coefficient cannot be computed

This procedure was completed at 16:21:33
finish
[Next command's output on page   1
include 'pearson.dat'.
[*  Test:       Pearson's product-moment coefficient of
[*              correlation
[*
[*  Author:     Thomas W. MacFarland, Ed.D.
[*
[*  Source:     McClave, James T., and Frank H. Dietrich, II.
[*                   STATISTICS, 4th edition.  San Francisco,
[*                   California:  Dellen Publishing Company, 1988.
[*                   ISBN 0-02-379260-4  Page 719
[*
[*  Software:   SPSS/PC+ Studentware
[*
[*  Scenario:   Based on data provided in Table 1, determine if
[*              there is a correlation (alpha = .05) between number
[*              of games won (baseball) and team batting average.
[*              (American League teams from the 1986 season will
[*              serve as the example for this exercise).
[*
[*
[*                                   Table 1
[*
[*                              Summary Data
[*
[*
[*
```

```
*
*              Texas                    87              .267
*
*              Detroit                  87              .263
*
*              Minnesota                71              .261
*
*              Baltimore                73              .258
*
*              California               92              .255
*
*              Milwaukee                77              .255
*
*              Seattle                  67              .253
*
*              Kansas City              76              .252
*
*              Oakland                  76              .252
*
*              Chicago                  72              .247
*
*  ------------------------------------------------------------
*
*  Ho:         There is no association between number of games won
*              and team batting average (alpha = .05).
*
*  Answer:     Answer(s) can be found in pearson.lis.  Briefly,
*
*              Computed  r  = .600
*
*              Criterion r  = .458 (alpha = .05, n = 14)
*
*              Computed r (.600) > Criterion r (.458)
*
*              Reject Ho ..... the association is significant
*
*              Be sure to rename spss.lis to pearson.lis.
*
*  Note:       Use (a) to signify an alphabetical string when key-
*              ing baseball teams.

DATA LIST /
     Team      01-20 (a)
     G_Won     22-23
     TBA       25-28.

VARIABLE LABELS
     Team      "American League, 1986 Season"
     G_Won     "Number of Games Won"
     TBA       "Team Batting Average".

BEGIN DATA.
Cleveland            84 .284
```

```
[New_York                90 .271
[Boston                  95 .271
[Toronto                 86 .269
[Texas                   87 .267
[Detroit                 87 .263
[Minnesota               71 .261
[Baltimore               73 .258
[California              92 .255
[Milwaukee               77 .255
[Seattle                 67 .253
[Kansas_City             76 .252
[Oakland                 76 .252
[Chicago                 72 .247
[END DATA.
CORRELATION VARIABLES = G_Won with TBA / OPTIONS 3 5 / STATISTICS 1.
[Next command's output on page   4
finish
```

Test: Oneway Analysis of Variance (ANOVA), with mean comparison (e.g., Tukey)

Author: Thomas W. MacFarland, Ed.D.

Source: McClave, James T., and Frank H. Dietrich, II. STATISTICS, 4th edition. San Francisco, California: Dellen Publishing Company, 1988. ISBN 0-02-379260-4 Page 505

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there are true differences (alpha = .05) between Nematocides #1, #2, #3, and #4.

Table 1

Yield (Pounds per Plot for the Same Variety of Tomatoes) by Nematocide Treatment

| Nematocide | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 18.6 | 18.7 | 19.4 | 19.0 |
| 18.2 | 19.3 | 19.9 | 18.5 |
| 17.6 | 18.9 | 19.7 | 18.6 |
| | | 19.1 | |

Note: In addition, calculate descriptive statistics for each group.

Ho: There is no difference in yield between nematocide treatments #1, #2, #3, and #4 (alpha = .05).

Answer: Answer(s) can be found in anova1.lis. Briefly,

Computed F = 8.63

Criterion F = 3.86 (alpha = .05, df = 3, 9)

```
*               Computed F (8.63) > Criterion F (3.86)
*
*               Reject Ho ..... differences are significant
*
*               Based on the use of Tukey mean comparison,
*
*               Nematocide #3 (19.53) > Nematocide # 1 (18.13).
*
*               The difference between all other comparisons
*               is due to chance.
*
*               Be sure to rename spss.lis to anova1.lis.

DATA LIST /
    Group        01
    Yield        03-06.

VARIABLE LABELS
    Group        "One of Four Nematocides (a Pesticide)"
    Yield        "Yield of the Same Tomato Variety (Pounds/Plot)".

VALUE LABELS
    Group        1 'Nematocide #1'
                 2 'Nematocide #2'
                 3 'Nematocide #3'
                 4 'Nematocide #4'.

BEGIN DATA.
1 18.6
1 18.2
1 17.6
2 18.7
2 19.3
2 18.9
3 19.4
3 19.9
3 19.7
3 19.1
4 19.0
4 18.5
4 18.6
END DATA.
                              SPSS/PC+ Studentware                    11/26/89
include 'anova1.dat'.
*  Test:        Oneway Analysis of Variance (ANOVA), with
*               mean comparison (e.g., Tukey)
*
*  Author:      Thomas W. MacFarland, Ed.D.
*
*  Source:      McClave, James T., and Frank H. Dietrich, II.
*                    STATISTICS, 4th edition.  San Francisco,
*                    California:  Dellen Publishing Company, 1988.
```

ISBN 0-02-379260-4 Page 505

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there are true differences (alpha = .05) between Nematocides #1, #2, #3, and #4.

Table 1

Yield (Pounds per Plot for the Same Variety of Tomatoes) by Nematocide Treatment

| Nematocide | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 18.6 | 18.7 | 19.4 | 19.0 |
| 18.2 | 19.3 | 19.9 | 18.5 |
| 17.6 | 18.9 | 19.7 | 18.6 |
| | | 19.1 | |

Note: In addition, calculate descriptive statistics for each group.

Ho: There is no difference in yield between nematocide treatments #1, #2, #3, and #4 (alpha = .05).

Answer: Answer(s) can be found in anova1.lis. Briefly,

Computed F = 8.63

Criterion F = 3.86 (alpha = .05, df = 3, 9)

Computed F (8.63) > Criterion F (3.86)

Reject Ho ..... differences are significant

Based on the use of Tukey mean comparison,

Nematocide #3 (19.53) > Nematocide # 1 (18.13).

```
*             The difference between all other comparisons
*             is due to chance.
*
*             Be sure to rename spss.lis to anova1.lis.

DATA LIST /
    Group        01
    Yield      03-06.

VARIABLE LABELS
    Group      "One of Four Nematocides (a Pesticide)"
    Yield      "Yield of the Same Tomato Variety (Pounds/Plot)".

VALUE LABELS
    Group      1 'Nematocide #1'
               2 'Nematocide #2'
               3 'Nematocide #3'
               4 'Nematocide #4'.

BEGIN DATA.
END DATA.
     13 cases are written to the compressed active file.

This procedure was completed at 19:53:35
ONEWAY Yield by Group (1,4) / RANGES = TUKEY / STATISTICS 1.
```

---

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- - - - - - - - - - - O N E W A Y - - - - - - - - - - -

Variable YIELD Yield of the Same Tomato Variety (Pounds
By Variable GROUP One of Four Nematocides (a Pesticide)

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 3 | 3.4561 | 1.1520 | 8.6342 | .0052 |
| Within Groups | 9 | 1.2008 | .1334 | | |
| Total | 12 | 4.6569 | | | |

---

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- - - - - - - - - - - O N E W A Y - - - - - - - - - - -

| Group | Count | Mean | Standard Deviation | Standard Error | 95 Pct Conf Int for Mean |
|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Grp 1 | 3 | 18.1333 | .5033 | .2906 | 16.8830 | To | 19.3837 |
| Grp 2 | 3 | 18.9667 | .3055 | .1764 | 18.2077 | To | 19.7256 |
| Grp 3 | 4 | 19.5250 | .3500 | .1750 | 18.9681 | To | 20.0819 |
| Grp 4 | 3 | 18.7000 | .2646 | .1528 | 18.0428 | To | 19.3572 |
| Total | 13 | 18.8846 | .6230 | .1728 | 18.5082 | To | 19.2611 |

| Group | Minimum | Maximum |
|---|---|---|
| Grp 1 | 17.6000 | 18.6000 |
| Grp 2 | 18.7000 | 19.3000 |
| Grp 3 | 19.1000 | 19.9000 |
| Grp 4 | 18.5000 | 19.0000 |
| Total | 17.6000 | 19.9000 |

---



- - - - - - - - - - - O N E W A Y - - - - - - - - - -

Variable YIELD Yield of the Same Tomato Variety (Pounds
By Variable GROUP One of Four Nematocides (a Pesticide)

Multiple Range Test

Tukey-HSD Procedure
Ranges for the .050 level -

4.41 4.41 4.41

The ranges above are table ranges.
The value actually compared with Mean(J)-Mean(I) is..
.2583 * Range * Sqrt(1/N(I) + 1/N(J))

(*) Denotes pairs of groups significantly different at the .050 level

---



- - - - - - - - - - - O N E W A Y - - - - - - - - - -

Variable YIELD Yield of the Same Tomato Variety (Pounds
(Continued)

G G G G
r r r r



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```
                          p p p p
     Mean       Group     1 4 2 3

    18.1333     Grp 1
    18.7000     Grp 4
    18.9667     Grp 2
    19.5250     Grp 3     *

This procedure was completed at 19:56:46
finish
[Next command's output on page   1
include 'anova1.dat'.
[*  Test:       Oneway Analysis of Variance (ANOVA), with
[*              mean comparison (e.g., Tukey)
[*
[*  Author:     Thomas W. MacFarland, Ed.D.
[*
[*  Source:     McClave, James T., and Frank H. Dietrich, II.
[*                   STATISTICS, 4th edition.  San Francisco,
[*                   California:  Dellen Publishing Company, 1988.
[*                   ISBN 0-02-379260-4  Page 505
[*
[*  Software:   SPSS/PC+ Studentware
[*
[*  Scenario:   Based on data provided in Table 1, determine if
[*              there are true differences (alpha = .05) between
[*              Nematocides #1, #2, #3, and #4.
[*
[*
[*                                  Table 1
[*
[*                Yield (Pounds per Plot for the Same Variety of
[*                      Tomatoes) by Nematocide Treatment
[*
[*
[*
```

```
[*
[*  Note:       In addition, calculate descriptive statistics for
[*              each group.
[*
[*  Ho:         There is no difference in yield between nematocide
[*              treatments #1, #2, #3, and #4 (alpha = .05).
[*
[*  Answer:     Answer(s) can be found in anova1.lis.  Briefly,
[*
[*              Computed  F  = 8.63
[*
[*              Criterion F  = 3.86 (alpha = .05, df = 3, 9)
[*
[*              Computed F (8.63) > Criterion F (3.86)
[*
[*              Reject Ho ..... differences are significant
[*
[*              Based on the use of Tukey mean comparison,
[*
[*              Nematocide #3 (19.53) > Nematocide # 1 (18.13).
[*
[*              The difference between all other comparisons
[*              is due to chance.
[*
[*              Be sure to rename spss.lis to anova1.lis.
[
[DATA LIST /
[    Group        01
[    Yield     03-06.
[
[VARIABLE LABELS
[    Group     "One of Four Nematocides (a Pesticide)"
[    Yield     "Yield of the Same Tomato Variety (Pounds/Plot)".
[
[VALUE LABELS
[    Group     1 'Nematocide #1'
[              2 'Nematocide #2'
[              3 'Nematocide #3'
[              4 'Nematocide #4'.
[
[BEGIN DATA.
[1 18.6
[1 18.2
[1 17.6
[2 18.7
[2 19.3
[2 18.9
[3 19.4
[3 19.9
[3 19.7
[3 19.1
[4 19.0
```

```
[4 18.5
[4 18.6
[END DATA.
ONEWAY Yield by Group (1,4) / RANGES = TUKEY / STATISTICS 1.
[Next command's output on page   6
finish
```

Test: Twoway Analysis of Variance (ANOVA)

Author: Thomas W. MacFarland, Ed.D.

Source: McClave, James T., and Frank H. Dietrich, II. STATISTICS, 4th edition. San Francisco, California: Dellen Publishing Company, 1988. ISBN 0-02-379260-4 Page 544

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there are true differences (alpha = .05) between type of display, pricing, and interaction(s) of display and pricing.

Table 1

Summary Data on In-store Promotions: Unit Sales by Display and Pricing Strategy

| | Pricing Strategy | | |
|---|---|---|---|
| Display | Regular | Reduced | Sell at Cost |
| Normal | 989 | 1,211 | 1,577 |
| | 1,025 | 1,215 | 1,559 |
| | 1,030 | 1,182 | 1,598 |
| Normal Plus | 1,191 | 1,860 | 2,492 |
| | 1,233 | 1,910 | 2,527 |
| | 1,221 | 1,926 | 2,511 |
| Twice Normal | 1,226 | 1,516 | 1,801 |
| | 1,202 | 1,501 | 1,833 |
| | 1,180 | 1,498 | 1,852 |

Note: In addition, calculate descriptive statistics for each group.

Ho: There is no difference in unit sales between variations of in-store promotional displays and pricing strategies (alpha = .05).

Answer: Answer(s) can be found in anova2.lis. Briefly,

```
*              there are significant differences between:
*
*              1.  type of display
*
*              2.  pricing strategy
*
*              3.  interactions between display and pricing
*
*              ================================================
*                                                    Signif
*              Source of Variation          F.      of Prob.
*
*              Main Effects              2415.632     .000
*                DISPLAY                 1709.373     .000
*                PRICE                   3121.892     .000
*
*              2-way Interactions
*                DISPLAY  PRICE           258.067     .000
*              ================================================
*
*              Reject Ho ..... differences are significant
*
*              Be sure to rename spss.lis to anova2.lis.

DATA LIST /
     Treat_mt 01-02
     Display    04
     Price      06
     Sales    08-11.

VARIABLE LABELS
     Treat_mt "Treatment # (3 Treatments/Cell x 9 Cells)"
     Display  "Type of In-store Promotional Display"
     Price    "Pricing Strategy"
     Sales    "Unit Sales ($) for the Promoted Item".

VALUE LABELS
     Display  1 'Normal'   2 'Normal Plus'   3 'Twice Normal' /
     Price    1 'Regular'  2 'Reduced'       3 'Sell at Cost'.

BEGIN DATA.
01 1 1 0989
02 1 1 1025
03 1 1 1030
04 1 2 1211
05 1 2 1215
06 1 2 1182
07 1 3 1577
08 1 3 1559
09 1 3 1598
10 2 1 1191
11 2 1 1233
```

```
12 2 1 1221
13 2 2 1860
14 2 2 1910
15 2 2 1926
16 2 3 2492
17 2 3 2527
18 2 3 2511
19 3 1 1226
20 3 1 1202
21 3 1 1180
22 3 2 1516
23 3 2 1501
24 3 2 1498
25 3 3 1801
26 3 3 1833
27 3 3 1852
END DATA.
```

SPSS/PC+ Studentware 11/26/89

```
Include 'anova2.dat'.
* Test:      Twoway Analysis of Variance (ANOVA)
*
* Author:    Thomas W. MacFarland, Ed.D.
*
* Source:    McClave, James T., and Frank H. Dietrich, II.
*                 STATISTICS, 4th edition.  San Francisco,
*                 California:  Dellen Publishing Company, 1988.
*                 ISBN 0-02-379260-4  Page 544
*
* Software:  SPSS/PC+ Studentware
*
* Scenario:  Based on data provided in Table 1, determine if
*            there are true differences (alpha = .05) between
*            type of display, pricing, and interaction(s) of
*            display and pricing.
```

Table 1

Summary Data on In-store Promotions: Unit Sales by Display and Pricing Strategy

| | Pricing Strategy | | |
|---|---|---|---|
| Display | Regular | Reduced | Sell at Cost |
| | 989 | 1,211 | 1,577 |
| Normal | 1,025 | 1,215 | 1,559 |

```
*                          1,030       1,182       1,598
*
*                          1,191       1,860       2,492
*              Normal Plus 1,233       1,910       2,527
*                          1,221       1,926       2,511
*
*                          1,226       1,516       1,801
*              Twice Normal1,202       1,501       1,833
*                          1,180       1,498       1,852
*
*  ------------------------------------------------------
*
*  Note:       In addition, calculate descriptive statistics for
*              each group.
*
*  Ho:         There is no difference in unit sales between
*              variations of in-store promotional displays and
*              pricing strategies (alpha = .05).
*
*  Answer:     Answer(s) can be found in anova2.lis.  Briefly,
*              there are significant differences between:
*
*              1.  type of display
*
*              2.  pricing strategy
*
*              3.  interactions between display and pricing
*
*              ================================================
*                                                    Signif
*              Source of Variation          F       of Prob.
*
*              Main Effects              2415.632     .000
*                DISPLAY                 1709.373     .000
*                PRICE                   3121.892     .000
*
*              2-way Interactions
*                DISPLAY  PRICE           258.067     .000
*              ================================================
*
*              Reject Ho ..... differences are significant
*
*              Be sure to rename spss.lis to anova2.lis.

DATA LIST /
     Treat_mt 01-02
     Display     04
     Price       06
     Sales    08-11.

VARIABLE LABELS
     Treat_mt "Treatment # (3 Treatments/Cell x 9 Cells)"
     Display  "Type of In-store Promotional Display"
```

```
     Price    "Pricing Strategy"
     Sales    "Unit Sales ($) for the Promoted Item".

VALUE LABELS
     Display  1 'Normal'   2 'Normal Plus'   3 'Twice Normal' /
     Price    1 'Regular'  2 'Reduced'       3 'Sell at Cost'.

BEGIN DATA.
END DATA.
     27 cases are written to the compressed active file.

This procedure was completed at 20:44:32
ANOVA Sales by Display (1,3) Price (1,3) / STATISTICS 3.
```

---



* * * C E L L  M E A N S * * *

SALES Unit Sales ($) for the Promoted Item
BY DISPLAY Type of In-store Promotional Display
PRICE Pricing Strategy

TOTAL POPULATION

| |
|---|
| 1550.59 |
| ( 27) |

DISPLAY

| 1 | 2 | 3 |
|---|---|---|
| 1265.11 | 1874.56 | 1512.11 |
| ( 9) | ( 9) | ( 9) |

---



PRICE

| 1 | 2 | 3 |
|---|---|---|
| 1144.11 | 1535.44 | 1972.22 |
| ( 9) | ( 9) | ( 9) |

| | PRICE | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| DISPLAY | | | |
| 1 | 1014.67 | 1202.67 | 1578.00 |
| | ( 3) | ( 3) | ( 3) |

```
        2   1215.00   1898.67   2510.00
            (     3)  (     3)  (     3)

        3   1202.67   1505.00   1828.67
            (     3)  (     3)  (     3)
```

---

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* * * A N A L Y S I S O F V A R I A N C E * * *

SALES Unit Sales ($) for the Promoted Item
BY DISPLAY Type of In-store Promotional Display
PRICE Pricing Strategy

| Source of Variation | Sum of Squares | DF | Mean Square | F | Signif of F |
|---|---|---|---|---|---|
| Main Effects | 4780446.370 | 4 | 1195111.593 | 2415.632 | .000 |
| DISPLAY | 1691392.519 | 2 | 845696.259 | 1709.373 | .000 |
| PRICE | 3089053.852 | 2 | 1544526.926 | 3121.892 | .000 |
| 2-way Interactions | 510704.815 | 4 | 127676.204 | 258.067 | .000 |
| DISPLAY PRICE | 510704.815 | 4 | 127676.204 | 258.067 | .000 |
| Explained | 5291151.185 | 8 | 661393.898 | 1336.849 | .000 |
| Residual | 8905.333 | 18 | 494.741 | | |
| Total | 5300056.519 | 26 | 203848.328 | | |

---

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```
     27 Cases were processed.
      0 Cases (   .0 PCT) were missing.

This procedure was completed at 20:48:21
finish
[Next command's output on page   1
include 'anova2.dat'.
[*  Test:      Twoway Analysis of Variance (ANOVA)
[*
[*  Author:    Thomas W. MacFarland, Ed.D.
[*
[*  Source:    McClave, James T., and Frank H. Dietrich, II.
[*                 STATISTICS, 4th edition.  San Francisco,
[*                 California:  Dellen Publishing Company, 1988.
[*                 ISBN 0-02-379260-4  Page 544
[*
```

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there are true differences (alpha = .05) between type of display, pricing, and interaction(s) of display and pricing.

Table 1

Summary Data on In-store Promotions: Unit Sales by Display and Pricing Strategy

| | Pricing Strategy | | |
|---|---|---|---|
| Display | Regular | Reduced | Sell at Cost |
| Normal | 989 | 1,211 | 1,577 |
| | 1,025 | 1,215 | 1,559 |
| | 1,030 | 1,182 | 1,598 |
| Normal Plus | 1,191 | 1,860 | 2,492 |
| | 1,233 | 1,910 | 2,527 |
| | 1,221 | 1,926 | 2,511 |
| Twice Normal | 1,226 | 1,516 | 1,801 |
| | 1,202 | 1,501 | 1,833 |
| | 1,180 | 1,498 | 1,852 |

Note: In addition, calculate descriptive statistics for each group.

Ho: There is no difference in unit sales between variations of in-store promotional displays and pricing strategies (alpha = .05).

Answer: Answer(s) can be found in anova2.lis. Briefly, there are significant differences between:

1. type of display
2. pricing strategy
3. interactions between display and pricing

==========

```
[*
[*                Source of Variation          F       Signif
[*                                                     of Prob.
[*
[*                Main Effects              2415.632      .000
[*                  DISPLAY                 1709.373      .000
[*                  PRICE                   3121.892      .000
[*
[*                2-way Interactions
[*                  DISPLAY  PRICE           258.067      .000
[*                ================================================
[*
[*                Reject Ho ..... differences are significant
[*
[*                Be sure to rename spss.lis to anova2.lis.
[
[DATA LIST /
[      Treat_mt 01-02
[      Display     04
[      Price       06
[      Sales    08-11.
[
[VARIABLE LABELS
[      Treat_mt "Treatment # (3 Treatments/Cell x 9 Cells)"
[      Display  "Type of In-store Promotional Display"
[      Price    "Pricing Strategy"
[      Sales    "Unit Sales ($) for the Promoted Item".
[
[VALUE LABELS
[      Display  1 'Normal'   2 'Normal Plus'   3 'Twice Normal' /
[      Price    1 'Regular'  2 'Reduced'       3 'Sell at Cost'.
[
[BEGIN DATA.
[01 1 1 0989
[02 1 1 1025
[03 1 1 1030
[04 1 2 1211
[05 1 2 1215
[06 1 2 1182
[07 1 3 1577
[08 1 3 1559
[09 1 3 1598
[10 2 1 1191
[11 2 1 1233
[12 2 1 1221
[13 2 2 1860
[14 2 2 1910
[15 2 2 1926
[16 2 3 2492
[17 2 3 2527
[18 2 3 2511
[19 3 1 1226
[20 3 1 1202
```

```
[21 3 1 1180
[22 3 2 1516
[23 3 2 1501
[24 3 2 1498
[25 3 3 1801
[26 3 3 1833
[27 3 3 1852
[END DATA.
ANOVA Sales by Display (1,3) Price (1,3) / STATISTICS 3.
[Next command's output on page   6
finish
```

Test: Using PLOT to display data associated with a correlation study (Pearson's product-moment coefficient of correlation)

Author: Thomas W. MacFarland, Ed.D.

Source: McClave, James T., and Frank H. Dietrich, II. STATISTICS, 4th edition. San Francisco, California: Dellen Publishing Company, 1988. ISBN 0-02-379260-4 Page 719

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there is a correlation (alpha = .05) between number of games won (baseball) and team batting average. (American League teams from the 1986 season will serve as the example for this exercise).

Plot the association.

Table 1

Summary Data

| Team | Number of Games Won | Team Batting Average |
|---|---|---|
| Cleveland | 84 | .284 |
| New York | 90 | .271 |
| Boston | 95 | .271 |
| Toronto | 86 | .269 |
| Texas | 87 | .267 |
| Detroit | 87 | .263 |
| Minnesota | 71 | .261 |
| Baltimore | 73 | .258 |
| California | 92 | .255 |
| Milwaukee | 77 | .255 |

```
*
*              Seattle                  67              .253
*
*              Kansas City              76              .252
*
*              Oakland                  76              .252
*
*              Chicago                  72              .247
*
*
*  Ho:         There is no association between number of games won
*              and team batting average (alpha = .05).
*
*  Note.       Use (a) to signify an alphabetical string when key-
*              ing baseball teams.
*
*  Answer:     Answer(s) can be found in plot1.lis.  Briefly,
*
*              Computed  r  = .600, a generally moderate positive
*              association.
*
*                y |          *
*                  |       *
*                  |    *          Representation of a
*                  | *             positive correlation
*                  |*
*                  |_____________
*                                x
*
*              Be sure to rename spss.lis to plot1.lis.

DATA LIST /
     Team      01-20 (a)
     G_Won     22-23
     TBA       25-28.

VARIABLE LABELS
     Team      "American League, 1986 Season"
     G_Won     "Number of Games Won"
     TBA       "Team Batting Average".

BEGIN DATA.
Cleveland            84 .284
New_York             90 .271
Boston               95 .271
Toronto              86 .269
Texas                87 .267
Detroit              87 .263
Minnesota            71 .261
Baltimore            73 .258
California           92 .255
Milwaukee            77 .255
```

```
Seattle              67 .253
Kansas_City          76 .252
Oakland              76 .252
Chicago              72 .247
END DATA.
                              SPSS/PC+ Studentware                    11/26/89
include 'plot1.dat'.
*  Test:       Using PLOT to display data associated with a
*              correlation study (Pearson's product-moment
*              coefficient of correlation)
*
*  Author:     Thomas W. MacFarland, Ed.D.
*
*  Source:     McClave, James T., and Frank H. Dietrich, II.
*                   STATISTICS, 4th edition.  San Francisco,
*                   California:  Dellen Publishing Company, 1988.
*                   ISBN 0-02-379260-4  Page 719
*
*  Software:   SPSS/PC+ Studentware
*
*  Scenario:   Based on data provided in Table 1, determine if
*              there is a correlation (alpha = .05) between number
*              of games won (baseball) and team batting average.
*              (American League teams from the 1986 season will
*              serve as the example for this exercise).
*
*              Plot the association.
```

Table 1

Summary Data

| Team | Number of Games Won | Team Batting Average |
|---|---|---|
| Cleveland | 84 | .284 |
| New York | 90 | .271 |
| Boston | 95 | .271 |
| Toronto | 86 | .269 |
| Texas | 87 | .267 |
| Detroit | 87 | .263 |

| | | |
|---|---|---|
| Minnesota | 71 | .261 |
| Baltimore | 73 | .258 |
| California | 92 | .255 |
| Milwaukee | 77 | .255 |
| Seattle | 67 | .253 |
| Kansas City | 76 | .252 |
| Oakland | 76 | .252 |
| Chicago | 72 | .247 |

---

Ho: There is no association between number of games won and team batting average (alpha = .05).

Note. Use (a) to signify an alphabetical string when keying baseball teams.

Answer: Answer(s) can be found in plot1.lis. Briefly,

Computed r = .600, a generally moderate positive association.

Representation of a positive correlation

Be sure to rename spss.lis to plot1.lis.

```
DATA LIST /
     Team      01-20 (a)
     G_Won     22-23
     TBA       25-28.

VARIABLE LABELS
     Team      "American League, 1986 Season"
     G_Won     "Number of Games Won"
     TBA       "Team Batting Average".

BEGIN DATA.
END DATA.
     14 cases are written to the compressed active file.
```

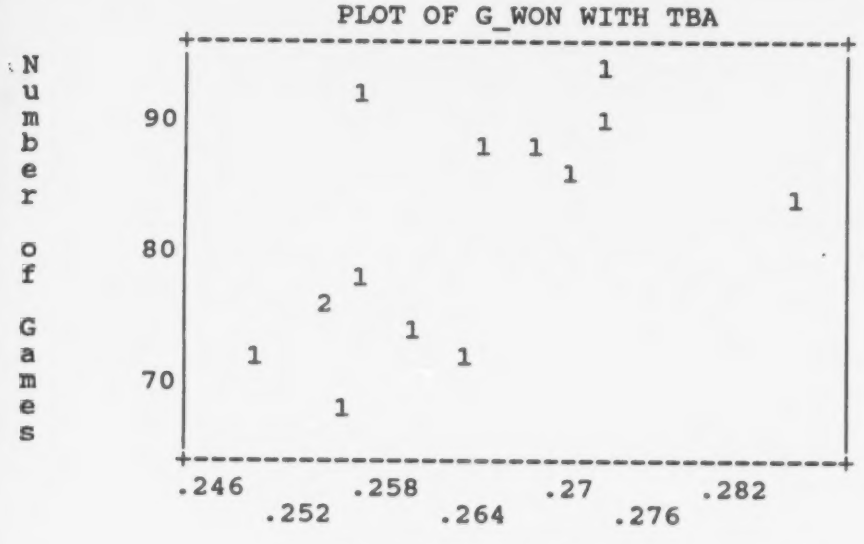
```
This procedure was completed at 21:32:48
PLOT HSIZE = 36 / VSIZE = 14 / FORMAT = REGRESSION / PLOT = G_Won with TBA.
PLOT requires 3664 BYTES of workspace for execution.
```

---

```
Page   2                    SPSS/PC+ Studentware                    11/26/89

* * * * * * * * * * * * * * * * * * P L O T * * * * * * * * * * * * * * * * * *

Data   Information

         14 unweighted cases accepted.
```

---

```
Page   3                    SPSS/PC+ Studentware                    11/26/89
```




---

```
Page   4                    SPSS/PC+ Studentware                    11/26/89
14 cases plotted. Regression statistics of G_WON on TBA:
Correlation  .60025 R Squared  .36030  S.E. of Est    7.34103 Sig.  .0232
Intercept(S.E.)  -55.55854( 52.53619)  Slope(S.E.)  522.36729(200.92770)

This procedure was completed at 21:35:06
finish
[Next command's output on page   1
include 'plot1.dat'.
[*  Test:       Using PLOT to display data associated with a
[*              correlation study (Pearson's product-moment
[*              coefficient of correlation)
[*
```

Author: Thomas W. MacFarland, Ed.D.

Source: McClave, James T., and Frank H. Dietrich, II. STATISTICS, 4th edition. San Francisco, California: Dellen Publishing Company, 1988. ISBN 0-02-379260-4 Page 719

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there is a correlation (alpha = .05) between number of games won (baseball) and team batting average. (American League teams from the 1986 season will serve as the example for this exercise).

Plot the association.

Table 1

Summary Data

| Team | Number of Games Won | Team Batting Average |
|---|---|---|
| Cleveland | 84 | .284 |
| New York | 90 | .271 |
| Boston | 95 | .271 |
| Toronto | 86 | .269 |
| Texas | 87 | .267 |
| Detroit | 87 | .263 |
| Minnesota | 71 | .261 |
| Baltimore | 73 | .258 |
| California | 92 | .255 |
| Milwaukee | 77 | .255 |
| Seattle | 67 | .253 |
| Kansas City | 76 | .252 |

```
[*
[*              Oakland                 76              .252
[*
[*              Chicago                 72              .247
[*
[*
[*  Ho:         There is no association between number of games won
[*              and team batting average (alpha = .05).
[*
[*  Note.       Use (a) to signify an alphabetical string when key-
[*              ing baseball teams.
[*
[*  Answer:     Answer(s) can be found in plot1.lis.  Briefly,
[*
[*              Computed  r  = .600, a generally moderate positive
[*              association.
[*
[*                y |          *
[*                  |        *
[*                  |      *          Representation of a
[*                  |    *            positive correlation
[*                  |  *
[*                  |_____________
[*                                x
[*
[*              Be sure to rename spss.lis to plot1.lis.
[
[DATA LIST /
[     Team      01-20 (a)
[     G_Won     22-23
[     TBA       25-28.
[
[VARIABLE LABELS
[     Team      "American League, 1986 Season"
[     G_Won     "Number of Games Won"
[     TBA       "Team Batting Average".
[
[BEGIN DATA.
[Cleveland            84 .284
[New_York             90 .271
[Boston               95 .271
[Toronto              86 .269
[Texas                87 .267
[Detroit              87 .263
[Minnesota            71 .261
[Baltimore            73 .258
[California           92 .255
[Milwaukee            77 .255
[Seattle              67 .253
[Kansas_City          76 .252
[Oakland              76 .252
[Chicago              72 .247
```

```
END DATA.
PLOT HSIZE = 36 / VSIZE = 14 / FORMAT = REGRESSION / PLOT = G_Won with TBA.
(Next command's output on page   5
finish
```

Test: Using HISTOGRAM to display data associated with a correlation study (Pearson's product-moment coefficient of correlation)

Author: Thomas W. MacFarland, Ed.D.

Source: McClave, James T., and Frank H. Dietrich, II. STATISTICS, 4th edition. San Francisco, California: Dellen Publishing Company, 1988. ISBN 0-02-379260-4 Page 719

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, determine if there is a correlation (alpha = .05) between number of games won (baseball) and team batting average. (American League teams from the 1986 season will serve as the example for this exercise).

Plot a histogram of number of games won (G_Won).

Table 1

Summary Data

| Team | Number of Games Won | Team Batting Average |
|---|---|---|
| Cleveland | 84 | .284 |
| New York | 90 | .271 |
| Boston | 95 | .271 |
| Toronto | 86 | .269 |
| Texas | 87 | .267 |
| Detroit | 87 | .263 |
| Minnesota | 71 | .261 |
| Baltimore | 73 | .258 |
| California | 92 | .255 |
| Milwaukee | 77 | .255 |

| | | |
|---|---|---|
| Seattle | 67 | .253 |
| Kansas City | 76 | .252 |
| Oakland | 76 | .252 |
| Chicago | 72 | .247 |

---

Ho: There is no association between number of games won and team batting average (alpha = .05).

Note. Use (a) to signify an alphabetical string when keying baseball teams.

Answer: Answer(s) can be found in plot2.lis. Briefly, a histogram of the data offers evidence of a "quasi-bell shaped curve." Remember, with low n it is difficult to obtain representation of a bell shaped curve.

The histogram of a bell shaped curve would appear as:

```
|X
|XX
|XXXX
|XXXXXX
|XXXXXXXX
|XXXXXXXXXX
|XXXXXXXXXXXX
|XXXXXXXXXXXXXX
|XXXXXXXXXXXXXXXX
|XXXXXXXXXXXXXXXXXX
|XXXXXXXXXXXXXXXX
|XXXXXXXXXXXXXX
|XXXXXXXXXXXX
|XXXXXXXXXX
|XXXXXXXX
|XXXXXXX
|XXXXX
|XX
|X
```

Be sure to rename spss.lis to plot2.lis.

```
DATA LIST /
     Team      01-20 (a)
     G_Won     22-23
     TBA       25-28.
```

```
VARIABLE LABELS
     Team      "American League, 1986 Season"
     G_Won     "Number of Games Won"
     TBA       "Team Batting Average".

BEGIN DATA.
Cleveland            84 .284
New_York             90 .271
Boston               95 .271
Toronto              86 .269
Texas                87 .267
Detroit              87 .263
Minnesota            71 .261
Baltimore            73 .258
California           92 .255
Milwaukee            77 .255
Seattle              67 .253
Kansas_City          76 .252
Oakland              76 .252
Chicago              72 .247
END DATA.
```

SPSS/PC+ Studentware 11/26/89

```
include 'plot2.dat'.
*  Test:      Using HISTOGRAM to display data associated with
*             a correlation study (Pearson's product-moment
*             coefficient of correlation)
*
*  Author:    Thomas W. MacFarland, Ed.D.
*
*  Source:    McClave, James T., and Frank H. Dietrich, II.
*                  STATISTICS, 4th edition.  San Francisco,
*                  California:  Dellen Publishing Company, 1988.
*                  ISBN 0-02-379260-4  Page 719
*
*  Software:  SPSS/PC+ Studentware
*
*  Scenario:  Based on data provided in Table 1, determine if
*             there is a correlation (alpha = .05) between number
*             of games won (baseball) and team batting average.
*             (American League teams from the 1986 season will
*             serve as the example for this exercise).
*
*             Plot a histogram of number of games won (G_Won).
*
*
*                                Table 1
*
*                            Summary Data
*
*
*
*
*
```

| Team | Number of Games Won | Team Batting Average |
|---|---|---|
| Cleveland | 84 | .284 |
| New York | 90 | .271 |
| Boston | 95 | .271 |
| Toronto | 86 | .269 |
| Texas | 87 | .267 |
| Detroit | 87 | .263 |
| Minnesota | 71 | .261 |
| Baltimore | 73 | .258 |
| California | 92 | .255 |
| Milwaukee | 77 | .255 |
| Seattle | 67 | .253 |
| Kansas City | 76 | .252 |
| Oakland | 76 | .252 |
| Chicago | 72 | .247 |

Ho: There is no association between number of games won and team batting average (alpha = .05).

Note. Use (a) to signify an alphabetical string when keying baseball teams.

Answer: Answer(s) can be found in plot2.lis. Briefly, a histogram of the data offers evidence of a "quasi-bell shaped curve." Remember, with low n it is difficult to obtain representation of a bell shaped curve.

The histogram of a bell shaped curve would appear as:

```
|X
|XX
|XXXX
|XXXXXX
```

```
*              |XXXXXXXX
*              |XXXXXXXXXX
*              |XXXXXXXXXXXX
*              |XXXXXXXXXXXXXX
*              |XXXXXXXXXXXXXXXX
*              |XXXXXXXXXXXXXXXXXX
*              |XXXXXXXXXXXXXXXX
*              |XXXXXXXXXXXXXX
*              |XXXXXXXXXXXX
*              |XXXXXXXXXX
*              |XXXXXXXX
*              |XXXXXXX
*              |XXXXX
*              |XX
*              |X
*
*             Be sure to rename spss.lis to plot2.lis.

DATA LIST /
     Team      01-20 (a)
     G_Won     22-23
     TBA       25-28.

VARIABLE LABELS
     Team      "American League, 1986 Season"
     G_Won     "Number of Games Won"
     TBA       "Team Batting Average".

BEGIN DATA.
END DATA.
     14 cases are written to the compressed active file.

This procedure was completed at 22:08:28
FREQUENCIES VARIABLES = G_Won / HISTOGRAM
MINIMUM (50)
MAXIMUM (100)
INCREMENT (5).

***** Memory allows a total of   7119 Values, accumulated across all Variables.
      There also may be up to    890 Value Labels for each Variable.
```

---

Page 2 SPSS/PC+ Studentware 11/26/89

G_WON Number of Games Won

| Value Label | Value | Frequency | Percent | Valid Percent | Cum Percent |
|---|---|---|---|---|---|
| | 67 | 1 | 7.1 | 7.1 | 7.1 |
| | 71 | 1 | 7.1 | 7.1 | 14.3 |
| | 72 | 1 | 7.1 | 7.1 | 21.4 |

| | | | | |
|---|---|---|---|---|
| 73 | 1 | 7.1 | 7.1 | 28.6 |
| 76 | 2 | 14.3 | 14.3 | 42.9 |
| 77 | 1 | 7.1 | 7.1 | 50.0 |
| 84 | 1 | 7.1 | 7.1 | 57.1 |
| 86 | 1 | 7.1 | 7.1 | 64.3 |
| 87 | 2 | 14.3 | 14.3 | 78.6 |
| 90 | 1 | 7.1 | 7.1 | 85.7 |
| 92 | 1 | 7.1 | 7.1 | 92.9 |
| 95 | 1 | 7.1 | 7.1 | 100.0 |
| TOTAL | 14 | 100.0 | 100.0 | |

---



G_WON Number of Games Won

```
  Count   Midpoint
      0      52.50 |
      0      57.50 |
      0      62.50 |
      1      67.50 |\\\\\
      3      72.50 |\\\\\\\\\\\\\\\
      3      77.50 |\\\\\\\\\\\\\\\
      1      82.50 |\\\\\
      3      87.50 |\\\\\\\\\\\\\\\
      2      92.50 |\\\\\\\\\\
      1      97.50 |\\\\\
                   I....+....I....+....I....+....I....+....I....+....I....+....I
                   0         1         2         3         4         5
                             Histogram Frequency
```

Valid Cases 14 Missing Cases 0

This procedure was completed at 22:14:50

---



```
finish
[Next command's output on page   1
include 'plot2.dat'.
[*  Test:       Using HISTOGRAM to display data associated with
[*              a correlation study (Pearson's product-moment
[*              coefficient of correlation)
[*
[*  Author:     Thomas W. MacFarland, Ed.D.
[*
[*  Source:     McClave, James T., and Frank H. Dietrich, II.
[*                   STATISTICS, 4th edition.  San Francisco,
[*                   California:  Dellen Publishing Company, 1988.
[*                   ISBN 0-02-379260-4  Page 719
[*
[*  Software:   SPSS/PC+ Studentware
[*
[*  Scenario:   Based on data provided in Table 1, determine if
```

there is a correlation (alpha = .05) between number of games won (baseball) and team batting average. (American League teams from the 1986 season will serve as the example for this exercise).

Plot a histogram of number of games won (G_Won).

Table 1

Summary Data

| Team | Number of Games Won | Team Batting Average |
|---|---|---|
| Cleveland | 84 | .284 |
| New York | 90 | .271 |
| Boston | 95 | .271 |
| Toronto | 86 | .269 |
| Texas | 87 | .267 |
| Detroit | 87 | .263 |
| Minnesota | 71 | .261 |
| Baltimore | 73 | .258 |
| California | 92 | .255 |
| Milwaukee | 77 | .255 |
| Seattle | 67 | .253 |
| Kansas City | 76 | .252 |
| Oakland | 76 | .252 |
| Chicago | 72 | .247 |

Ho: There is no association between number of games won and team batting average (alpha = .05).

Note. Use (a) to signify an alphabetical string when key-

```
*              ing baseball teams.
*
*  Answer:     Answer(s) can be found in plot2.lis.  Briefly,
*              a histogram of the data offers evidence of a
*              "quasi-bell shaped curve."  Remember, with low
*              n it is difficult to obtain representation of
*              a bell shaped curve.
*
*              The histogram of a bell shaped curve would
*              appear as:
*
*              |X
*              |XX
*              |XXXX
*              |XXXXXX
*              |XXXXXXXX
*              |XXXXXXXXXX
*              |XXXXXXXXXXXX
*              |XXXXXXXXXXXXXX
*              |XXXXXXXXXXXXXXXX
*              |XXXXXXXXXXXXXXXXXX
*              |XXXXXXXXXXXXXXXX
*              |XXXXXXXXXXXXXX
*              |XXXXXXXXXXXX
*              |XXXXXXXXXX
*              |XXXXXXXX
*              |XXXXXXX
*              |XXXXX
*              |XX
*              |X
*
*              Be sure to rename spss.lis to plot2.lis.

DATA LIST /
     Team      01-20 (a)
     G_Won     22-23
     TBA       25-28.

VARIABLE LABELS
     Team      "American League, 1986 Season"
     G_Won     "Number of Games Won"
     TBA       "Team Batting Average".

BEGIN DATA.
Cleveland            84 .284
New_York             90 .271
Boston               95 .271
Toronto              86 .269
Texas                87 .267
Detroit              87 .263
Minnesota            71 .261
Baltimore            73 .258
```

```
[California              92 .255
[Milwaukee               77 .255
[Seattle                 67 .253
[Kansas_City             76 .252
[Oakland                 76 .252
[Chicago                 72 .247
[END DATA.
FREQUENCIES VARIABLES = G_Won / HISTOGRAM
MINIMUM (50)
MAXIMUM (100)
INCREMENT (5).
[Next command's output on page   4
finish
```

Test: Simple linear regression

Author: Thomas W. MacFarland, Ed.D.

Source: McClave, James T., and Frank H. Dietrich, II. STATISTICS, 4th edition. San Francisco, California: Dellen Publishing Company, 1988. ISBN 0-02-379260-4 Page 694

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, develop a model describing the relationship between y (G_Won) and x (TBA). (American League teams from the 1986 season will serve as the example for this exercise).

Table 1

Summary Data

| Team | Number of Games Won | Team Batting Average |
|---|---|---|
| Cleveland | 84 | .284 |
| New York | 90 | .271 |
| Boston | 95 | .271 |
| Toronto | 86 | .269 |
| Texas | 87 | .267 |
| Detroit | 87 | .263 |
| Minnesota | 71 | .261 |
| Baltimore | 73 | .258 |
| California | 92 | .255 |
| Milwaukee | 77 | .255 |
| Seattle | 67 | .253 |
| Kansas City | 76 | .252 |

```
*              Oakland                  76              .252
*
*              Chicago                  72              .247
*
*
*  Ho:         There is no association between number of games won
*              and team batting average (alpha = .05).
*
*  Answer:     Answer(s) can be found in regress.lis.  Briefly,
*
*              ^
*              y = -55.56 + 522.37 x
*
*              Be sure to rename spss.lis to regress.lis.
*
*  Note:       Use (a) to signify an alphabetical string when key-
*              ing baseball teams.

DATA LIST /
     Team      01-20 (a)
     G_Won     22-23
     TBA       25-28.

VARIABLE LABELS
     Team      "American League, 1986 Season"
     G_Won     "Number of Games Won"
     TBA       "Team Batting Average".

BEGIN DATA.
Cleveland            84 .284
New_York             90 .271
Boston               95 .271
Toronto              86 .269
Texas                87 .267
Detroit              87 .263
Minnesota            71 .261
Baltimore            73 .258
California           92 .255
Milwaukee            77 .255
Seattle              67 .253
Kansas_City          76 .252
Oakland              76 .252
Chicago              72 .247
END DATA.
                              SPSS/PC+ Studentware                    11/27/89
include 'regress.dat'.
*  Test:       Simple linear regression
*
*  Author:     Thomas W. MacFarland, Ed.D.
*
*  Source:     McClave, James T., and Frank H. Dietrich, II.
*                   STATISTICS, 4th edition.  San Francisco,
```

California: Dellen Publishing Company, 1988.
ISBN 0-02-379260-4 Page 694

Software: SPSS/PC+ Studentware

Scenario: Based on data provided in Table 1, develop a model describing the relationship between y (G_Won) and x (TBA). (American League teams from the 1986 season will serve as the example for this exercise).

Table 1

Summary Data

| Team | Number of Games Won | Team Batting Average |
|---|---|---|
| Cleveland | 84 | .284 |
| New York | 90 | .271 |
| Boston | 95 | .271 |
| Toronto | 86 | .269 |
| Texas | 87 | .267 |
| Detroit | 87 | .263 |
| Minnesota | 71 | .261 |
| Baltimore | 73 | .258 |
| California | 92 | .255 |
| Milwaukee | 77 | .255 |
| Seattle | 67 | .253 |
| Kansas City | 76 | .252 |
| Oakland | 76 | .252 |
| Chicago | 72 | .247 |

Ho: There is no association between number of games won

```
*              and team batting average (alpha = .05).
*
*  Answer:     Answer(s) can be found in regress.lis.  Briefly,
*
*              ^
*              y = -55.56 + 522.37 x
*
*              Be sure to rename spss.lis to regress.lis.
*
*  Note:       Use (a) to signify an alphabetical string when key-
*              ing baseball teams.

DATA LIST /
     Team      01-20 (a)
     G_Won     22-23
     TBA       25-28.

VARIABLE LABELS
     Team      "American League, 1986 Season"
     G_Won     "Number of Games Won"
     TBA       "Team Batting Average".

BEGIN DATA.
END DATA.
     14 cases are written to the compressed active file.

This procedure was completed at  2:25:59
REGRESSION VARIABLES = G_Won TBA / DEPENDENT = G_Won / METHOD = ENTER.
```

---

Page 2 SPSS/PC+ Studentware 11/27/89

* * * * M U L T I P L E R E G R E S S I O N * * * *

Listwise Deletion of Missing Data

Equation Number 1 Dependent Variable.. G_WON Number of Games Won

Beginning Block Number 1. Method: Enter

---

Page 3 SPSS/PC+ Studentware 11/27/89

* * * * M U L T I P L E R E G R E S S I O N * * * *

Equation Number 1 Dependent Variable.. G_WON Number of Games Won

Variable(s) Entered on Step Number
1.. TBA Team Batting Average

Multiple R .60025

```
R Square                .36030
Adjusted R Square       .30699
Standard Error         7.34103

Analysis of Variance
                    DF        Sum of Squares        Mean Square
Regression           1             364.23925          364.23925
Residual            12             646.68932           53.89078

F =       6.75884        Signif F =  .0232
```

---

```
Page   4                    SPSS/PC+ Studentware                        11/27/89

        * * * *  M U L T I P L E  R E G R E S S I O N  * * * *

Equation Number 1    Dependent Variable..   G_WON   Number of Games Won


------------------ Variables in the Equation ------------------

Variable                B         SE B        Beta           T  Sig T

TBA             522.36729    200.92771      .60025       2.600  .0232
(Constant)      -55.55854     52.53619                  -1.058  .3111


End Block Number   1   All requested variables entered.

This procedure was completed at  2:29:10
finish
[Next command's output on page   1
include 'regress.dat'.
[*  Test:       Simple linear regression
[*
[*  Author:     Thomas W. MacFarland, Ed.D.
[*
[*  Source:     McClave, James T., and Frank H. Dietrich, II.
[*                   STATISTICS, 4th edition.  San Francisco,
[*                   California:  Dellen Publishing Company, 1988.
[*                   ISBN 0-02-379260-4  Page 694
[*
[*  Software:   SPSS/PC+ Studentware
[*
[*  Scenario:   Based on data provided in Table 1, develop a model
[*              describing the relationship between y (G_Won) and
[*              x (TBA).  (American League teams from the 1986
[*              season will serve as the example for this exercise).
[*
[*
[*                                  Table 1
[*
[*                                Summary Data
```

| Team | Number of Games Won | Team Batting Average |
|---|---|---|
| Cleveland | 84 | .284 |
| New York | 90 | .271 |
| Boston | 95 | .271 |
| Toronto | 86 | .269 |
| Texas | 87 | .267 |
| Detroit | 87 | .263 |
| Minnesota | 71 | .261 |
| Baltimore | 73 | .258 |
| California | 92 | .255 |
| Milwaukee | 77 | .255 |
| Seattle | 67 | .253 |
| Kansas City | 76 | .252 |
| Oakland | 76 | .252 |
| Chicago | 72 | .247 |

Ho: There is no association between number of games won and team batting average (alpha = .05).

Answer: Answer(s) can be found in regress.lis. Briefly,

$\hat{y} = -55.56 + 522.37\ x$

Be sure to rename spss.lis to regress.lis.

Note: Use (a) to signify an alphabetical string when keying baseball teams.

```
DATA LIST /
     Team      01-20 (a)
```

```
[      G_Won     22-23
[      TBA       25-28.
[
[VARIABLE LABELS
[      Team      "American League, 1986 Season"
[      G_Won     "Number of Games Won"
[      TBA       "Team Batting Average".
[
[BEGIN DATA.
[Cleveland              84 .284
[New_York               90 .271
[Boston                 95 .271
[Toronto                86 .269
[Texas                  87 .267
[Detroit                87 .263
[Minnesota              71 .261
[Baltimore              73 .258
[California             92 .255
[Milwaukee              77 .255
[Seattle                67 .253
[Kansas_City            76 .252
[Oakland                76 .252
[Chicago                72 .247
[END DATA.
REGRESSION VARIABLES = G_Won TBA / DEPENDENT = G_Won / METHOD = ENTER.
[Next command's output on page   5
finish
```

```
* Test:      Using SELECT IF to calculate descriptive statistics
*            for parts of a data set
*
* Author:    Thomas W. MacFarland, Ed.D.
*
* Source:    Personal notes
*
* Software:  SPSS/PC+ Studentware
*
* Scenario:  Based on data provided in Table 1, determine the
*            mean for subject Tom.
*
*            By using SELECT IF, do not include Test #1 in the
*            calculations.
```

Table 1

Summary Data

| Test # | Tom | Bob | Roy | Sue | Bea |
|---|---|---|---|---|---|
| 1 | 089 | 091 | 081 | 081 | 083 |
| 2 | 091 | 081 | 071 | 089 | 100 |
| 3 | 091 | 065 | 045 | 081 | 092 |
| 4 | 082 | 071 | 062 | 079 | 081 |
| 5 | 072 | 067 | 091 | 085 | 094 |

```
* Answer:    Answer(s) can be found in selectif.lis.  Briefly,
*
*            Mean for Tom (Test #2 to Test #5) = 84.00
*
*            Be sure to rename spss.lis to selectif.lis.

DATA LIST /
     Test_#       01
     Tom        03-05
     Bob        07-09
     Roy        11-13
     Sue        15-17
     Bea        19-21.

VARIABLE LABELS
```

```
    Test_#      "Test Number (of five)"
    Tom         "Thomas R. O'Callish"
    Bob         "Robert E. Lee, IV"
    Roy         "Leroy G. Anglesh"
    Sue         "Susan V. Douglas"
    Bea         "Beatrice H. Malcolm".

SELECT IF (Test_# > 1).

BEGIN DATA.
1 089 091 081 081 083
2 091 081 071 089 100
3 091 065 045 081 092
4 082 071 062 079 081
5 072 067 091 085 094
END DATA.
```

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```
include 'selectif.dat'.
* Test:       Using SELECT IF to calculate descriptive statistics
*             for parts of a data set
*
* Author:     Thomas W. MacFarland, Ed.D.
*
* Source:     Personal notes
*
* Software:   SPSS/PC+ Studentware
*
* Scenario:   Based on data provided in Table 1, determine the
*             mean for subject Tom.
*
*             By using SELECT IF, do not include Test #1 in the
*             calculations.
```

Table 1

Summary Data

| Test # | Tom | Bob | Roy | Sue | Bea |
|---|---|---|---|---|---|
| 1 | 089 | 091 | 081 | 081 | 083 |
| 2 | 091 | 081 | 071 | 089 | 100 |
| 3 | 091 | 065 | 045 | 081 | 092 |
| 4 | 082 | 071 | 062 | 079 | 081 |

```
*              5         072       067       091       085       094
*
*
*  Answer:     Answer(s) can be found in selectif.lis.  Briefly,
*
*              Mean for Tom (Test #2 to Test #5) = 84.00
*
*              Be sure to rename spss.lis to selectif.lis.

DATA LIST /
     Test_#        01
     Tom         03-05
     Bob         07-09
     Roy         11-13
     Sue         15-17
     Bea         19-21.

VARIABLE LABELS
     Test_#      "Test Number (of five)"
     Tom         "Thomas R. O'Callish"
     Bob         "Robert E. Lee, IV"
     Roy         "Leroy G. Anglesh"
     Sue         "Susan V. Douglas"
     Bea         "Beatrice H. Malcolm".

SELECT IF (Test_# > 1).

BEGIN DATA.
END DATA.
      4 cases are written to the compressed active file.

This procedure was completed at  0:42:36
FREQUENCIES VARIABLES = Tom / STATISTICS = MEAN.

***** Memory allows a total of   7119 Values, accumulated across all Variables.
      There also may be up to     890 Value Labels for each Variable.
```

---

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TOM Thomas R. O'Callish

| Value Label | Value | Frequency | Percent | Valid Percent | Cum Percent |
|---|---|---|---|---|---|
| | 72 | 1 | 25.0 | 25.0 | 25.0 |
| | 82 | 1 | 25.0 | 25.0 | 50.0 |
| | 91 | 2 | 50.0 | 50.0 | 100.0 |
| | TOTAL | 4 | 100.0 | 100.0 | |

Mean 84.000

```
Valid Cases       4      Missing Cases     0

This procedure was completed at  0:43:49
------------------------------------------------------------------------------
Page   3                      SPSS/PC+ Studentware                    11/27/89
finish
[Next command's output on page   1
include 'selectif.dat'.
[*  Test:       Using SELECT IF to calculate descriptive statistics
[*              for parts of a data set
[*
[*  Author:     Thomas W. MacFarland, Ed.D.
[*
[*  Source:     Personal notes
[*
[*  Software:   SPSS/PC+ Studentware
[*
[*  Scenario:   Based on data provided in Table 1, determine the
[*              mean for subject Tom.
[*
[*              By using SELECT IF, do not include Test #1 in the
[*              calculations.
[*
[*
[*                                    Table 1
[*
[*                                 Summary Data
[*
[*
[*
```

```
[
[DATA LIST /
[       Test_#          01
[       Tom           03-05
[       Bob           07-09
[       Roy           11-13
[       Sue           15-17
[       Bea           19-21.
[
[VARIABLE LABELS
[       Test_#      "Test Number (of five)"
[       Tom         "Thomas R. O'Callish"
[       Bob         "Robert E. Lee, IV"
[       Roy         "Leroy G. Anglesh"
[       Sue         "Susan V. Douglas"
[       Bea         "Beatrice H. Malcolm".
[
[SELECT IF (Test_# > 1).
[
[BEGIN DATA.
[1 089 091 081 081 083
[2 091 081 071 089 100
[3 091 065 045 081 092
[4 082 071 062 079 081
[5 072 067 091 085 094
[END DATA.
FREQUENCIES VARIABLES = Tom / STATISTICS = MEAN.
[Next command's output on page   3
finish
```

```
* Test:      Using COMPUTE to calculate descriptive statistics
*            that will be different than the original data set
*
* Author:    Thomas W. MacFarland, Ed.D.
*
* Source:    Personal notes
*
* Software:  SPSS/PC+ Studentware
*
* Scenario:  Based on data provided in Table 1, determine the
*            mean for subject Tom.
*
*            By using COMPUTE, each datum for Tom will be
*            increased by a value of "10."
```

Table 1

Summary Data

| Test # | Tom | Bob | Roy | Sue | Bea |
|---|---|---|---|---|---|
| 1 | 089 | 091 | 081 | 081 | 083 |
| 2 | 091 | 081 | 071 | 089 | 100 |
| 3 | 091 | 065 | 045 | 081 | 092 |
| 4 | 082 | 071 | 062 | 079 | 081 |
| 5 | 072 | 067 | 091 | 085 | 094 |

```
* Answer:    Answer(s) can be found in compute.lis.  Briefly,
*
*            Mean for Tom = 95.00
*
*            Be sure to rename spss.lis to compute.lis.

DATA LIST /
     Test_#      01
     Tom      03-05
     Bob      07-09
     Roy      11-13
     Sue      15-17
     Bea      19-21.

VARIABLE LABELS
```

```
      Test_#     "Test Number (of five)"
      Tom        "Thomas R. O'Callish"
      Bob        "Robert E. Lee, IV"
      Roy        "Leroy G. Anglesh"
      Sue        "Susan V. Douglas"
      Bea        "Beatrice H. Malcolm".

COMPUTE Tom = Tom + 10.

BEGIN DATA.
1 089 091 081 081 083
2 091 081 071 089 100
3 091 065 045 081 092
4 082 071 062 079 081
5 072 067 091 085 094
END DATA.
                                SPSS/PC+ Studentware                    11/27/89
include 'compute.dat'.
*  Test:       Using COMPUTE to calculate descriptive statistics
*              that will be different than the original data set
*
*  Author:     Thomas W. MacFarland, Ed.D.
*
*  Source:     Personal notes
*
*  Software:   SPSS/PC+ Studentware
*
*  Scenario:   Based on data provided in Table 1, determine the
*              mean for subject Tom.
*
*              By using COMPUTE, each datum for Tom will be
*              increased by a value of "10."
*
*
*                                   Table 1
*
*                                Summary Data
*
*
*
*
*
*              Test #      Tom       Bob       Roy       Sue       Bea
*
*
*                1         089       091       081       081       083
*
*                2         091       081       071       089       100
*
*                3         091       065       045       081       092
*
*                4         082       071       062       079       081
*
```

```
*                5          072       067       091       085       094
*
*
*
*  Answer:       Answer(s) can be found in compute.lis.  Briefly,
*
*                Mean for Tom = 95.00
*
*
*                Be sure to rename spss.lis to compute.lis.

DATA LIST /
     Test_#          01
     Tom           03-05
     Bob           07-09
     Roy           11-13
     Sue           15-17
     Bea           19-21.

VARIABLE LABELS
     Test_#      "Test Number (of five)"
     Tom         "Thomas R. O'Callish"
     Bob         "Robert E. Lee, IV"
     Roy         "Leroy G. Anglesh"
     Sue         "Susan V. Douglas"
     Bea         "Beatrice H. Malcolm".

COMPUTE Tom = Tom + 10.

BEGIN DATA.
END DATA.
      5 cases are written to the compressed active file.

This procedure was completed at  0:55:40
FREQUENCIES VARIABLES = Tom / STATISTICS = MEAN.

***** Memory allows a total of   7119 Values, accumulated across all Variables.
      There also may be up to     890 Value Labels for each Variable.
```

---

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TOM Thomas R. O'Callish

| Value Label | Value | Frequency | Percent | Valid Percent | Cum Percent |
|---|---|---|---|---|---|
| | 82 | 1 | 20.0 | 20.0 | 20.0 |
| | 92 | 1 | 20.0 | 20.0 | 40.0 |
| | 99 | 1 | 20.0 | 20.0 | 60.0 |
| | 101 | 2 | 40.0 | 40.0 | 100.0 |
| | TOTAL | 5 | 100.0 | 100.0 | |

```
Mean          95.000

Valid Cases       5      Missing Cases     0

This procedure was completed at  0:57:13
-------------------------------------------------------------------------------
Page   3                    SPSS/PC+ Studentware                      11/27/89
finish
[Next command's output on page   1
include 'compute.dat'.
[*  Test:       Using COMPUTE to calculate descriptive statistics
[*              that will be different than the original data set
[*
[*  Author:     Thomas W. MacFarland, Ed.D.
[*
[*  Source:     Personal notes
[*
[*  Software:   SPSS/PC+ Studentware
[*
[*  Scenario:   Based on data provided in Table 1, determine the
[*              mean for subject Tom.
[*
[*              By using COMPUTE, each datum for Tom will be
[*              increased by a value of "10."
[*
[*
[*                                   Table 1
[*
[*                              Summary Data
[*
[*
[*
[*
[*              ---------------------------------------------------
[*              ---------------------------------------------------
[*              Test #      Tom       Bob       Roy       Sue       Bea
[*              ---------------------------------------------------
[*
[*                1         089       091       081       081       083
[*
[*                2         091       081       071       089       100
[*
[*                3         091       065       045       081       092
[*
[*                4         082       071       062       079       081
[*
[*                5         072       067       091       085       094
[*              ---------------------------------------------------
[*
[*  Answer:     Answer(s) can be found in compute.lis.  Briefly,
[*
[*              Mean for Tom = 95.00
[*
```

```
[*              Be sure to rename spss.lis to compute.lis.
[
[DATA LIST /
[       Test_#          01
[       Tom          03-05
[       Bob          07-09
[       Roy          11-13
[       Sue          15-17
[       Bea          19-21.
[
[VARIABLE LABELS
[       Test_#      "Test Number (of five)"
[       Tom         "Thomas R. O'Callish"
[       Bob         "Robert E. Lee, IV"
[       Roy         "Leroy G. Anglesh"
[       Sue         "Susan V. Douglas"
[       Bea         "Beatrice H. Malcolm".
[
[COMPUTE Tom = Tom + 10.
[
[BEGIN DATA.
[1 089 091 081 081 083
[2 091 081 071 089 100
[3 091 065 045 081 092
[4 082 071 062 079 081
[5 072 067 091 085 094
[END DATA.
FREQUENCIES VARIABLES = Tom / STATISTICS = MEAN.
[Next command's output on page   3
finish
```

```
*  Test:       Using IF to calculate descriptive statistics that
*              will be different than the original data set
*
*  Author:     Thomas W. MacFarland, Ed.D.
*
*  Source:     Personal notes
*
*  Software:   SPSS/PC+ Studentware
*
*  Scenario:   Based on data provided in Table 1, determine the
*              mean for subject Tom.
*
*              By using IF, the overall mean for Tom will be
*              different than originally suggested.
*
*
*                                   Table 1
*
*                                Summary Data
*
*
*
```

```
     Test_#     "Test Number (of five)"
     Tom        "Thomas R. O'Callish"
     Bob        "Robert E. Lee, IV"
     Roy        "Leroy G. Anglesh"
     Sue        "Susan V. Douglas"
     Bea        "Beatrice H. Malcolm".

IF (Test_# = 1) Tom = 100.

BEGIN DATA.
1 089 091 081 081 083
2 091 081 071 089 100
3 091 065 045 081 092
4 082 071 062 079 081
5 072 067 091 085 094
END DATA.
                                SPSS/PC+ Studentware                    11/27/89
include 'if.dat'.
*  Test:        Using IF to calculate descriptive statistics that
*               will be different than the original data set
*
*  Author:      Thomas W. MacFarland, Ed.D.
*
*  Source:      Personal notes
*
*  Software:    SPSS/PC+ Studentware
*
*  Scenario:    Based on data provided in Table 1, determine the
*               mean for subject Tom.
*
*               By using IF, the overall mean for Tom will be
*               different than originally suggested.
```

Table 1

Summary Data

| Test # | Tom | Bob | Roy | Sue | Bea |
|---|---|---|---|---|---|
| 1 | 089 | 091 | 081 | 081 | 083 |
| 2 | 091 | 081 | 071 | 089 | 100 |
| 3 | 091 | 065 | 045 | 081 | 092 |
| 4 | 082 | 071 | 062 | 079 | 081 |

```
*              5         072       067       091       085       094
*
*
*  Answer:     Answer(s) can be found in if.lis.  Briefly,
*
*              Mean for Tom = 87.20
*
*              Be sure to rename spss.lis to if.lis.

DATA LIST /
     Test_#        01
     Tom         03-05
     Bob         07-09
     Roy         11-13
     Sue         15-17
     Bea         19-21.

VARIABLE LABELS
     Test_#     "Test Number (of five)"
     Tom        "Thomas R. O'Callish"
     Bob        "Robert E. Lee, IV"
     Roy        "Leroy G. Anglesh"
     Sue        "Susan V. Douglas"
     Bea        "Beatrice H. Malcolm".

IF (Test_# = 1) Tom = 100.

BEGIN DATA.
END DATA.
      5 cases are written to the compressed active file.

This procedure was completed at  1:06:57
FREQUENCIES VARIABLES = Tom / STATISTICS = MEAN.

***** Memory allows a total of   7119 Values, accumulated across all Variables.
      There also may be up to     890 Value Labels for each Variable.
```

---

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TOM Thomas R. O'Callish

| Value Label | Value | Frequency | Percent | Valid Percent | Cum Percent |
|---|---|---|---|---|---|
| | 72 | 1 | 20.0 | 20.0 | 20.0 |
| | 82 | 1 | 20.0 | 20.0 | 40.0 |
| | 91 | 2 | 40.0 | 40.0 | 80.0 |
| | 100 | 1 | 20.0 | 20.0 | 100.0 |
| | TOTAL | 5 | 100.0 | 100.0 | |

```
Mean          87.200

Valid Cases       5      Missing Cases     0

This procedure was completed at  1:08:48
------------------------------------------------------------------------------
Page   3                    SPSS/PC+ Studentware                    11/27/89
finish
[Next command's output on page   1
include 'if.dat'.
[*  Test:       Using IF to calculate descriptive statistics that
[*              will be different than the original data set
[*
[*  Author:     Thomas W. MacFarland, Ed.D.
[*
[*  Source:     Personal notes
[*
[*  Software:   SPSS/PC+ Studentware
[*
[*  Scenario:   Based on data provided in Table 1, determine the
[*              mean for subject Tom.
[*
[*              By using IF, the overall mean for Tom will be
[*              different than originally suggested.
[*
[*
[*                                   Table 1
[*
[*                              Summary Data
[*
[*
[*
```

```
[*              Be sure to rename spss.lis to if.lis.
[
[DATA LIST /
[       Test_#          01
[       Tom           03-05
[       Bob           07-09
[       Roy           11-13
[       Sue           15-17
[       Bea           19-21.
[
[VARIABLE LABELS
[       Test_#      "Test Number (of five)"
[       Tom         "Thomas R. O'Callish"
[       Bob         "Robert E. Lee, IV"
[       Roy         "Leroy G. Anglesh"
[       Sue         "Susan V. Douglas"
[       Bea         "Beatrice H. Malcolm".
[
[IF (Test_# = 1) Tom = 100.
[
[BEGIN DATA.
[1 089 091 081 081 083
[2 091 081 071 089 100
[3 091 065 045 081 092
[4 082 071 062 079 081
[5 072 067 091 085 094
[END DATA.
FREQUENCIES VARIABLES = Tom / STATISTICS = MEAN.
[Next command's output on page   3
finish
```

```
*  Test:      Descriptive Statistics, Using Percentiles
*
*  Author:    Thomas W. MacFarland, Ed.D.
*
*  Source:    Personal notes
*
*  Software:  SPSS/PC+ Studentware
*
*  Scenario:  Based on data provided in Table 1, determine the
*             following percentiles for each student:
*
*             1.  25th percentile
*
*             2.  50th percentile
*
*             3.  75th percentile
```

Table 1

Summary Data

| Tom | Bob | Roy | Sue | Bea |
|---|---|---|---|---|
| 089 | 091 | 081 | 081 | 083 |
| 091 | 081 | 071 | 089 | 100 |
| 091 | 065 | 045 | 081 | 092 |
| 082 | 071 | 062 | 079 | 081 |
| 072 | 067 | 091 | 085 | 094 |

```
*  Answer:    Answer(s) for each student can be found in pct.lis.
*
*             Be sure to rename spss.lis to pct.lis.

DATA LIST /
     Tom         01-03
     Bob         06-08
     Roy         11-13
     Sue         16-18
     Bea         21-23.

VARIABLE LABELS
     Tom         "Thomas R. O'Callish"
```

```
     Bob         "Robert E. Lee, IV"
     Roy         "Leroy G. Anglesh"
     Sue         "Susan V. Douglas"
     Bea         "Beatrice H. Malcolm".

BEGIN DATA.
089  091  081  081  083
091  081  071  089  100
091  065  045  081  092
082  071  062  079  081
072  067  091  085  094
END DATA.
                          SPSS/PC+ Studentware                    11/26/89
include 'pct.dat'.
*  Test:       Descriptive Statistics, Using Percentiles
*
*  Author:     Thomas W. MacFarland, Ed.D.
*
*  Source:     Personal notes
*
*  Software:   SPSS/PC+ Studentware
*
*  Scenario:   Based on data provided in Table 1, determine the
*              following percentiles for each student:
*
*              1.  25th percentile
*
*              2.  50th percentile
*
*              3.  75th percentile
*
*
*                                  Table 1
*
*                              Summary Data
*
*
*
```

```
*
*  Answer:    Answer(s) for each student can be found in pct.lis.
*
*             Be sure to rename spss.lis to pct.lis.

DATA LIST /
     Tom        01-03
     Bob        06-08
     Roy        11-13
     Sue        16-18
     Bea        21-23.

VARIABLE LABELS
     Tom        "Thomas R. O'Callish"
     Bob        "Robert E. Lee, IV"
     Roy        "Leroy G. Anglesh"
     Sue        "Susan V. Douglas"
     Bea        "Beatrice H. Malcolm".

BEGIN DATA.
END DATA.
      5 cases are written to the compressed active file.

This procedure was completed at 22:57:51
FREQUENCIES VARIABLES = ALL / PERCENTILES = 25 50 75.

***** Memory allows a total of   7119 Values, accumulated across all Variables.
      There also may be up to     890 Value Labels for each Variable.

------------------------------------------------------------------------------
Page   2                    SPSS/PC+ Studentware                    11/26/89

TOM       Thomas R. O'Callish

  Value Label                Value  Frequency  Percent  Valid Percent  Cum Percent

                                72          1     20.0           20.0         20.0
                                82          1     20.0           20.0         40.0
                                89          1     20.0           20.0         60.0
                                91          2     40.0           40.0        100.0
                                       -------  -------        -------
                             TOTAL          5    100.0          100.0

Percentile     Value      Percentile     Value      Percentile     Value

  25.00       77.000        50.00       89.000        75.00       91.000

Valid Cases       5      Missing Cases     0
------------------------------------------------------------------------------
Page   3                    SPSS/PC+ Studentware                    11/26/89
```

BOB Robert E. Lee, IV

| Value Label | Value | Frequency | Percent | Valid Percent | Cum Percent |
|---|---|---|---|---|---|
| | 65 | 1 | 20.0 | 20.0 | 20.0 |
| | 67 | 1 | 20.0 | 20.0 | 40.0 |
| | 71 | 1 | 20.0 | 20.0 | 60.0 |
| | 81 | 1 | 20.0 | 20.0 | 80.0 |
| | 91 | 1 | 20.0 | 20.0 | 100.0 |
| | TOTAL | 5 | 100.0 | 100.0 | |

| Percentile | Value | Percentile | Value | Percentile | Value |
|---|---|---|---|---|---|
| 25.00 | 66.000 | 50.00 | 71.000 | 75.00 | 86.000 |

Valid Cases 5 Missing Cases 0

---



ROY Leroy G. Anglesh

| Value Label | Value | Frequency | Percent | Valid Percent | Cum Percent |
|---|---|---|---|---|---|
| | 45 | 1 | 20.0 | 20.0 | 20.0 |
| | 62 | 1 | 20.0 | 20.0 | 40.0 |
| | 71 | 1 | 20.0 | 20.0 | 60.0 |
| | 81 | 1 | 20.0 | 20.0 | 80.0 |
| | 91 | 1 | 20.0 | 20.0 | 100.0 |
| | TOTAL | 5 | 100.0 | 100.0 | |

| Percentile | Value | Percentile | Value | Percentile | Value |
|---|---|---|---|---|---|
| 25.00 | 53.500 | 50.00 | 71.000 | 75.00 | 86.000 |

Valid Cases 5 Missing Cases 0

---



SUE Susan V. Douglas

| Value Label | Value | Frequency | Percent | Valid Percent | Cum Percent |
|---|---|---|---|---|---|
| | 79 | 1 | 20.0 | 20.0 | 20.0 |
| | 81 | 2 | 40.0 | 40.0 | 60.0 |
| | 85 | 1 | 20.0 | 20.0 | 80.0 |
| | 89 | 1 | 20.0 | 20.0 | 100.0 |

| | | | |
|---|---|---|---|
| TOTAL | 5 | 100.0 | 100.0 |

| Percentile | Value | Percentile | Value | Percentile | Value |
|---|---|---|---|---|---|
| 25.00 | 80.000 | 50.00 | 81.000 | 75.00 | 87.000 |

Valid Cases 5 Missing Cases 0

---



BEA Beatrice H. Malcolm

| Value Label | Value | Frequency | Percent | Valid Percent | Cum Percent |
|---|---|---|---|---|---|
| | 81 | 1 | 20.0 | 20.0 | 20.0 |
| | 83 | 1 | 20.0 | 20.0 | 40.0 |
| | 92 | 1 | 20.0 | 20.0 | 60.0 |
| | 94 | 1 | 20.0 | 20.0 | 80.0 |
| | 100 | 1 | 20.0 | 20.0 | 100.0 |
| | TOTAL | 5 | 100.0 | 100.0 | |

| Percentile | Value | Percentile | Value | Percentile | Value |
|---|---|---|---|---|---|
| 25.00 | 82.000 | 50.00 | 92.000 | 75.00 | 97.000 |

Valid Cases 5 Missing Cases 0

This procedure was completed at 23:00:51

---



```
finish
[Next command's output on page   1
include 'pct.dat'.
[*  Test:      Descriptive Statistics, Using Percentiles
[*
[*  Author:    Thomas W. MacFarland, Ed.D.
[*
[*  Source:    Personal notes
[*
[*  Software:  SPSS/PC+ Studentware
[*
[*  Scenario:  Based on data provided in Table 1, determine the
[*             following percentiles for each student:
[*
[*             1.  25th percentile
[*
[*             2.  50th percentile
[*
[*             3.  75th percentile
[*
```

```
[*
[*                              Table 1
[*
[*                           Summary Data
[*
[*
[*
```

```
DATA LIST /
     Test_#        01
     Tom         03-05
     Bob         07-09
     Roy         11-13
     Sue         15-17
     Bea         19-21.

VARIABLE LABELS
     Test_#      "Test Number (of five)"
     Tom         "Thomas R. O'Callish"
     Bob         "Robert E. Lee, IV"
     Roy         "Leroy G. Anglesh"
     Sue         "Susan V. Douglas"
     Bea         "Beatrice H. Malcolm".
```

| Test # | Tom | Bob | Roy | Sue | Bea |
|---|---|---|---|---|---|
| 1 | 89 | 91 | 81 | 81 | 83 |
| 2 | 91 | 81 | 71 | 89 | 100 |
| 3 | 91 | 65 | 45 | 81 | 92 |
| 4 | 82 | 71 | 62 | 79 | 81 |
| 5 | 72 | 67 | 91 | 85 | 94 |
| Count | 5 | 5 | 5 | 5 | 5 |
| Mean | 85.00 | 75.00 | 70.00 | 83.00 | 90.00 |